



ONline Ethernet Management Module Installation and Operation Guide

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How to Use This Guide

This guide presents the principal features of the 3Com ONline™ Ethernet Network Management Module (EMM) for version 4.0 software. It includes instructions for installing the EMM into the ONline System Concentrator and it also gives a physical description of the EMM, including the LEDs, Reset Button, and RS-232 serial port connector on the module faceplate.

Instructions are also provided for using the EMM to manage the concentrator through a terminal connected to the RS-232 serial port connector. The commands used to configure the EMM to manage the concentrator and modules are described in Chapter 3.

Troubleshooting procedures that may help diagnose problems during installation and during operation are provided in Chapter 4.

A complete set of alphabetized ONline management commands is provided in the *ONline Management Commands Guide* (17-00403). Each command is described in detail with examples of its syntax, options, and use.

Audience

This guide is intended for the following people at your site:

- ❑ Network manager or administrator
- ❑ Hardware installer

Structure of This Guide

This guide contains five chapters, three appendices, and an index:

Chapter 1 - Introduction – Presents the key features and management functions of the EMM.

Chapter 2, Unpacking and Installing the Module – Provides illustrated procedures for installing the EMM into the ONline System Concentrator. This chapter also describes the front panel indicators (LEDs), the Reset Button, and RS-232 serial port connector. It also explains how to connect a terminal to the EMM.

Chapter 3, Startup and Management Functions – Explains how to configure the EMM to manage an Ethernet network. These configurations include terminal settings, default system values, and configuring the EMM for communication with SNMP-based management systems. This chapter also describes how to monitor your Ethernet network using the SHOW commands.

Chapter 4, Troubleshooting – Provides help in isolating and correcting problems that may arise during installation and during normal operation.

Chapter 5, Software Download Instructions – Explains how to download new software code to the Flash EPROM in the EMM.

Appendix A, Specifications – Provides technical specifications for the EMM, such as the electrical and environmental specifications.

Appendix B, RS-232 Cable Specification and Modem Use –Describes the various RS-232 cable configurations that can be used to connect a device to the EMM serial port. This appendix also explains how a modem should be configured for connection to the EMM.

Appendix C, - MIB Groups – Lists the 3Com MIB groups and the MIB II groups that the EMM supports.





Appendix D, - Technical Support – Lists the various methods for contacting the 3Com technical support organization and for accessing other product support services.

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Document Conventions

The following document conventions are used in this manual:

Convention	Indicates	Example
Courier text	User input	In the Agent Information Form, enter <code>MIS</code> in the New Contact field.
	System output	After pressing the Apply button, the system displays the message <code>Transmitting data.</code>
Bold command string	Path names	Before you begin, read the <code>readme.txt</code> file located in <code>/usr/snm/agents</code> .
Italic text in braces	User-substituted identifiers	Use the following command to show port details: <code>SHOW PORT {slot.all} VERBOSE</code>
Capitalized text in plain brackets	Keyboard entry by the user	Type your password and press <code>[ENTER]</code> .
Italics	Text emphasis, document titles	Ensure that you press the Apply button <i>after</i> you add the new search parameters.

Convention	Indicates	Example
Note:	A Note . The information is important	Note: Use STP lobe cables for your system.
 Caution:	A Caution . A condition may damage software or hardware	 Caution: Do not put your installation diskettes on a magnetic surface. This may damage the diskettes.
 Warning:	A Warning . A condition may threaten personal safety	 Warning: Wear eye protection when performing these maintenance procedures.

Related Documents

This section provides information on supporting documentation, including:

- ❑ 3Com Documents
- ❑ Reference Documents

3Com Documents

The following documents provide additional information on 3Com products:

17-Slot ONline System Concentrator Installation and Operation Guide – Explains how to install, operate, and manage the 3Com ONline 17-Slot System Concentrator (Models 5017C-LS and 5017C with load sharing).

6-Slot ONline System Concentrator Installation and Operation Guide – Explains how to install, operate, and manage the 3Com ONline 6-Slot System Concentrator.

ONline Token Ring Management Module Installation and Operation Guide – Explains how to install, operate, and use the 3Com ONline Token Ring Management Module.

ONline Management Commands Guide – Provides an alphabetized reference resource describing all ONline management commands.

For a complete list of 3Com documents, contact your 3Com representative.

Reference Documents

The following documents supply related background information:

Case, J., Fedor, M., Scoffstall, M., and J. Davin, *The Simple Network Management Protocol*, RFC 1157, University of Tennessee at Knoxville, Performance Systems International and the MIT Laboratory for Computer Science, May 1990.

Rose, M., and K. McCloghrie, *Structure and Identification of Management Information for TCP/IP-based Internets*, RFC 1155, Performance Systems International and Hughes LAN Systems, May 1990.

1

Introduction

This chapter presents an overview of the ONline™ Ethernet Management Module (EMM) for software version 4.0 software. A brief description of the new features in version 4.0 is presented first. Also included is a sample application of using the EMM in a network configuration.

The remainder of this chapter describes:

- ❑ EMM Overview
- ❑ Network Management Access
- ❑ The ONline Backplane Architecture

The ONline Ethernet Management Module

The EMM is a single-slot module designed to work with the 3Com ONline System Concentrators. The EMM provides connection to an IEEE 802.3 Ethernet Local Area Network (LAN), enabling you to fully manage and control your Ethernet network down to the port level. In addition, the EMM contains advanced monitoring and control capabilities which allow you to configure and check status on all Ethernet modules.

The major features of the EMM include:

- ❑ Telnet support for remotely managing the EMM via inband connection
- ❑ Inband network management via SNMP for local and remote configuration capabilities for all concentrators in the network.
- ❑ Out-of-band network management via an RS-232 terminal connection for local and remote configuration capabilities for all concentrators on the network
- ❑ Dynamic network control and management to the module and port level
- ❑ Flash PROM designed for quick upgrade to the newest version of software using inband or out-of-band downloads
- ❑ Automatic detection of faults and failures
- ❑ Security features to prevent unauthorized use
- ❑ Continuous monitoring and reporting of key network statistics
- ❑ Support of the 3Com TriChannel™ Architecture, ONdemand Port-Switching, and fault tolerance capabilities

Figure 1-1 shows a typical implementation of EMMs.

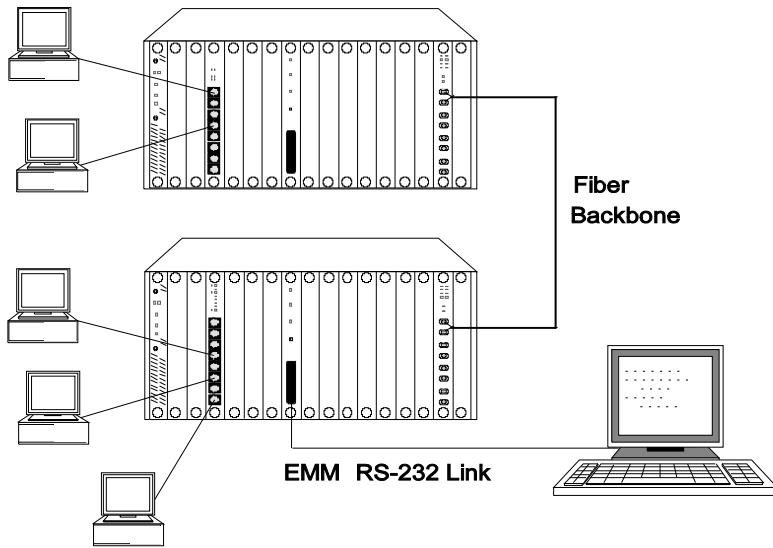


Figure 1-1. EMMs in Network Configuration

Theory of Operation

The EMM can be installed into any slot in the concentrator and communicates with all other modules in the concentrator via a dedicated control bus on the concentrator backplane as shown in Figure 1-2.

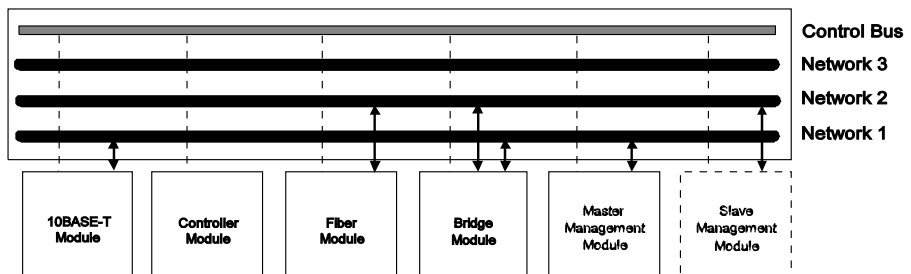


Figure 1-2. Ethernet Management Module Communication in the ONline System Concentrator

Like media modules installed in the ONline System Concentrator, the EMM is assigned to a network on the concentrator backplane. The configuration and fault-detection capability of the EMM is protocol-independent and enables you to configure all Ethernet modules as well as Token Ring and FDDI modules. In addition, via the Control Bus, the EMM can configure and check status on all modules in the concentrator, even if they are assigned to different networks or are isolated.

If you have modules assigned to different Ethernet networks in a concentrator, you should use multiple EMMs to track statistics on the individual networks. For configuration management, however, only one EMM in the concentrator can be the master EMM - all other EMMs are considered slaves.

A slave EMM can collect statistics and listen to traffic on the network to which it is assigned. Since the slave does not have *control* of the Control Bus, it cannot configure modules or detect faults. The slave module will take over as master if the master EMM fails, thus providing fault tolerance for your concentrator management. The administrator assigns a mastership priority level between 1 and 10 to each EMM.

Since all EMMs are factory set with a priority level 10, the first EMM you install will automatically become the master for that concentrator. All other EMMs you install should have their mastership priority changed to a lower value so as not to conflict with the first EMM.

Complete ONline Control

When you install an EMM into a concentrator for the first time and it becomes master, it automatically learns and saves the configurations of all existing modules and their ports. The EMM provides the following features that maximize security and minimize the risk of losing module and port configuration settings:

- ❑ All known modules installed in an ONline System Concentrator *after* an EMM has been installed will have all ports disabled to prevent unapproved connections and will be set to the network setting of isolated. The one exception is when a module is unknown to the EMM, in which case it will be configured off its dip switch settings.
- ❑ If you remove any module from the concentrator and then reinstall it, or another module of the same type in the original slot, the EMM will automatically configure it as it was as of the last save.
- ❑ If you replace an EMM with another EMM, the new EMM automatically learns the module and port configurations. However, you will need to configure the new EMM to the proper terminal and device settings.

ONline Ethernet Management Module Versions

There are three versions of the ONline Ethernet Management Module: Starter(5101M-MGTS),Basic(5101M-MGTB),andAdvanced(5101M-MGTA). The following paragraphs explain the differences between these three versions.

The EMM Starter Version

The EMM Starter includes all of the functions of the Basic software, with the following exception:

- ❑ Can only manage modules that are assigned to the same network as the EMM

The EMM Basic Version

The EMM Basic provides:

- Local inband software upgrades using TFTP (Trivial File Transfer Protocol) in maintenance mode
- SNMP support
- Out-of-band software upgrade
- Modem support (up to 9600 baud)
- Master/slave network management
- Automatic statistics reporting
- Telnet support for remotely managing the EMM via inband connection

The EMM Advanced Version

The EMM Advanced includes all of the functions of the Basic software plus the following features:

- Local and remote inband software upgrades using TFTP
- Enhanced security through MAC address tracking per port
- Cross-module redundancy (ability to set port redundancy using different modules)
- The ability to receive traps from other SNMP agents

Network Management Access

The EMM provides several ways to access network management. For inband management, the EMM provides built-in SNMP (Simple Network Management Protocol) agent, the de facto industry standard for network management. The agent will let you manage EMMs through SNMP-based network management solutions.

For out-of-band management, you can connect an ASCII terminal to the RS-232 port on the module faceplate and manage the EMM using the command-line interface. You also have the flexibility to use Telnet for inband management using the same extensive command-line interface.

The EMM also provides the Remote_login and Telnet features. Remote_login is based on the 3Com proprietary protocol, RCP (Remote Character Protocol). Telnet support is based on a fully compliant TCP/IP stack.

Network Management Functions

The EMM provides management and control capabilities in six major areas:

- ❑ Configurations - When logged in under the administrator password, you can configure the EMM, Ethernet network, modules, ports, and terminal settings.
- ❑ Fault, Performance, and Traffic Statistics Monitoring - Typical terminal management systems only report statistics when you request them. You can configure the EMM to continuously monitor and report key statistics by invoking the MONITOR command. The statistics on the screen are updated periodically to give a snapshot of the network.
- ❑ Security Control - The EMM provides two important security features that prevent unauthorized access to devices on the network - address-to-port security and a two-level password protection feature.

- ❑ SNMP Support - SNMP (Simple Network Management Protocol) is a protocol defined by the Internet community. The EMM acts as an agent in an SNMP managed environment responding to SNMP requests and generating SNMP traps.
- ❑ Inband and Out-of-Band Download - The EMM provides both inband and out-of-band download features. An inband download is performed via TFTP (Trivial File Transfer Protocol). The out-of-band download is performed using Xmodem software and a connection to the RS-232 serial port on the front panel of the EMM.
- ❑ Telnet Support - The Telnet command enables you to log in remotely to any EMM on the network and manage it from a remote EMM. You can also manage an EMM from a workstation with Telnet support.

ONline Backplane Architecture

The 3Com unique backplane architecture provides you with the power and flexibility to create multiple Ethernet, Token Ring, FDDI networks in one ONline System Concentrator. This backplane architecture allows the following networks to run in a single ONline System Concentrator:

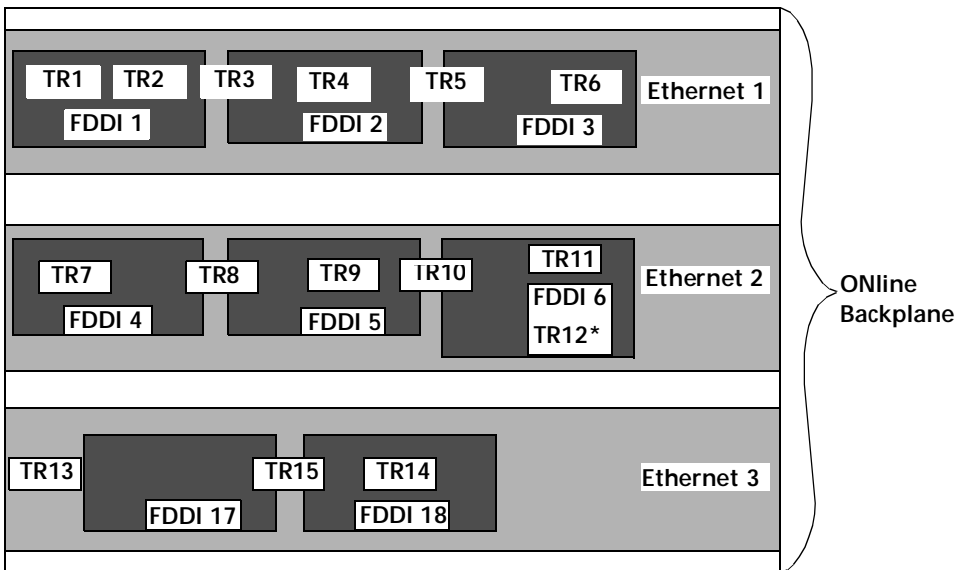
- ❑ three separate Ethernet networks and one isolated network
- ❑ seven backplane Token Ring networks and one isolated network
- ❑ four FDDI networks and one isolated network

Figure 1-3 illustrates how Ethernet, Token Ring, and FDDI networks coexist on the concentrator backplane. Note in Figure 1-3 that Ethernet networks and paths correspond. That is, Ethernet_1 network is always allocated to Ethernet path 1, Ethernet_2 network is always allocated to Ethernet path 2, and Ethernet_3 network is always allocated to Ethernet path 3.

This is not true for Token Ring and FDDI networks and paths. There are 7 available Token Ring *networks* and 15 Token Ring *paths*. For FDDI, there are 4 available FDDI *networks* and 8 FDDI *paths*. When you assign a module or port to a network, the master management module dynamically allocates the best possible path currently available for your configuration.

Following Figure 1-3 are Table 1-1, Table 1-2, and Table 1-3, which provide reference tables for configuring Ethernet, Token Ring, and FDDI networks in one concentrator. These tables define which networks paths are removed when certain network paths are used. Refer to these charts to determine the number and types of different protocol combinations you can have in one concentrator.

You may want to issue the SHOW NETWORK PATHS command before and after you configure networks to modules or ports to display which network paths are in use.



*TR12 overlays part of FDDI 6, but it does not affect the Ethernet 2 path.

Figure 1-3. TriChannel Backplane Architecture Assignments

As shown in Table 1-1, Ethernet_3 is the best Ethernet network selection to use in a mixed protocol environment because it affects the least amount of Token Ring and FDDI network paths.

Table 1-1. Ethernet Backplane Combination Reference Chart

Ethernet Paths	Token Ring Paths	FDDI Paths
Ethernet 1 removes	Token Ring 1 Token Ring 2 Token Ring 3 Token Ring 4 Token Ring 5 Token Ring 6	FDDI 1 FDDI 2 FDDI 3
Ethernet 2 removes	Token Ring 7 Token Ring 8 Token Ring 9 Token Ring 10 Token Ring 11	FDDI 4 FDDI 5 FDDI 6
Ethernet 3 removes	Token Ring 13 Token Ring 14 Token Ring 15	FDDI 7 FDDI 8

Table 1-2. Token Ring Backplane Combination Reference Chart

Token Ring Paths	Ethernet Paths	FDDI Paths
Token Ring 1 removes	Ethernet 1	FDDI 1
Token Ring 2 removes	Ethernet 1	FDDI 1
Token Ring 3 removes	Ethernet 1	FDDI 1 and FDDI 2

Table 1-2. Token Ring Backplane Combination Reference Chart (Continued)

Token Ring 4 removes	Ethernet 1	FDDI 2
Token Ring 5 removes	Ethernet 1	FDDI 2 and FDDI 3
Token Ring 6 removes	Ethernet 1	FDDI 3
Token Ring 7 removes	Ethernet 2	FDDI 4
Token Ring 8 removes	Ethernet 2	FDDI 4 and FDDI 5
Token Ring 9 removes	Ethernet 2	FDDI 5
Token Ring 10 removes	Ethernet 2	FDDI 5 and FDDI 6
Token Ring 11 removes	Ethernet 2	FDDI 6
Token Ring 12 removes		FDDI 6
Token Ring 13 removes	Ethernet 3	
Token Ring 14 removes	Ethernet 3	FDDI 8
Token Ring 15 removes	Ethernet 3	FDDI 7 and FDDI 8

Table 1-3. FDDI Backplane Combination Reference Chart

FDDI Paths	Ethernet Paths	Token Ring Paths
FDDI 1 removes	Ethernet 1	Token Ring 1 Token Ring 2 Token Ring 3
FDDI 2 removes	Ethernet 1	Token Ring 3 Token Ring 4 Token Ring 5
FDDI 3 removes	Ethernet 1	Token Ring 5 Token Ring 6

Table 1-3. FDDI Backplane Combination Reference Chart

FDDI 4 removes	Ethernet 2	Token Ring 7 Token Ring 8
FDDI 5 removes	Ethernet 2	Token Ring 8 Token Ring 9 Token Ring 10
FDDI 6 removes	Ethernet 2	Token Ring 10 Token Ring 11 Token Ring 12
FDDI 7 removes	Ethernet 3	Token Ring 15
FDDI 8 removes	Ethernet 3	Token Ring 14 Token Ring 15

Where To Go From Here

This chapter presented an overview of the ONline Ethernet Management Module and its control capabilities. The next chapter, *Unpacking and Installing the Module*, explains how you install the module into your concentrator.

2 *Unpacking and Installing the Module*

This chapter describes the precautionary, unpacking, and installation procedures for the ONline Ethernet Management Module (EMM). It also describes the module's front panel LEDs, Reset Button, and RS-232 serial port connector. After you install the module, follow the steps in Chapter 3 to configure the module for proper operation.

Precautionary Procedures

Electrostatic discharge (ESD) can damage the static-sensitive devices on circuit boards. To avoid this kind of damage, use the following precautions when handling the EMM:

- ❑ Do not remove the board from its anti-static shielding bag until you are ready to insert it into the concentrator.
- ❑ Use proper grounding techniques when inspecting and installing the EMM. These techniques include using a foot strap and grounded mat or wearing a grounded static discharge wrist strap. An alternate method is to touch a grounded rack or other source of ground *before* you handle the EMM.

Unpacking Procedure

Use the following procedure when unpacking the EMM:

1. Verify that the EMM is the correct model by matching the model number listed on the side of the shipping carton to the model number you ordered (5101M-MGTB, 5101M-MGTA, or 5101M-MGTS).

Note that the product model number printed on the shipping box differs from the model number on the product. The model number on the shipping box contains the prefix '3C9'.

2. Remove the module, in its anti-static bag, from the shipping carton.
3. Remove the module from the anti-static shielding bag and inspect it for damage. Always handle the module by the faceplate being careful not to touch the components.
4. If the module appears to be damaged, replace it in the anti-static shielding bag, return it to the shipping carton and contact your local supplier.

We suggest you keep the shipping carton and anti-static shielding bag in which your module was shipped in case you later want to repackage the module for storage or shipment.

We also suggest that you record the serial number of your EMM. A log for this and other information specific to your modules under the Slot Usage Chart in Appendix B of the *ONline System Concentrator Installation and Operation Guide*.

Installation Procedures

For a new installation where you have received a new ONline System Concentrator and all the modules, the following steps must be performed *prior* to installing the EMM:

- ❑ Install the concentrator in its location (rack, table, etc.) referring to the instructions in the *ONline System Concentrator Installation and Operation Guide*.
- ❑ Remove blank panels on the concentrators to expose empty slots for the Controller Module, EMM, and ONline modules.
- ❑ Install the Controller Module and ONline modules into the board guides at the top *and* bottom of the slots and slide them into the concentrator. Make sure the connectors are firmly seated in the backplane of the concentrator.
- ❑ Fasten the spring-loaded screws on the front panels of the modules to the concentrator with your fingers (do not overtighten).
- ❑ Plug the power cord into an outlet and verify that all modules come up in their default state. Optionally, press the LED Test button on the Controller Module to verify that all LEDs are functional.

Installing the EMM into an existing installation *does not* require you to power down the concentrator. The EMM, like all other ONline modules, has the ability to be “hot swapped,” meaning that you can install the module into any open slot and remove it with the concentrator in an operating state. Use the following procedure if you are installing the EMM into an existing installation.

1. Install the EMM into the board guides at the top and bottom of the empty slot and slide it into the concentrator as shown in Figure 2-1. Make sure the connector is firmly seated in the backplane of the concentrator.

Wait for the Status LED and Master Mgt Module LED to light solid green. At this point the EMM will learn the default module and port settings for all modules installed in the concentrator.

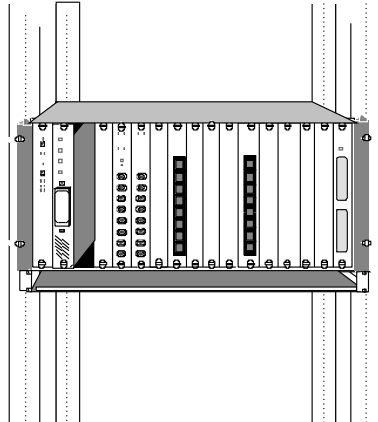


Figure 2-1. Installing the Ethernet Management Module

2. Fasten the spring-loaded screws on the front panel of the EMM faceplate to the concentrator with your fingers (do not overtighten).
3. If a terminal (out-of-band) connection is desired, verify that the terminal meets the factory defaults of the EMM or you will not be able to communicate with the module. The default EMM settings are:
 - 9600 baud
 - 8 data bits
 - No parity
 - 2 stop bits
4. Attach one end of an RS-232 cable to the RS-232 serial port connector on the front of the EMM. Loop the cable through the concentrator cable tray (if installed) and attach the other end to the RS-232 serial port connector on a terminal or personal computer as shown in Figure 2-2.

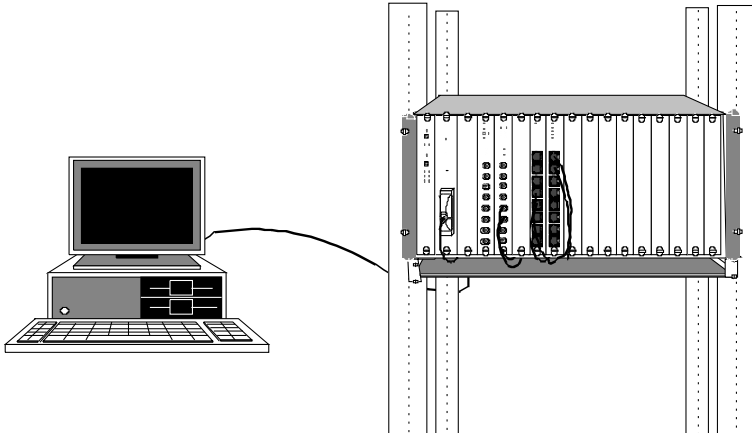


Figure 2-2. Installed EMM Connected to a Terminal

The RS-232 cable can be a maximum of 50 ft. in length. There are several legal RS-232 cable configurations available depending on your installation. Refer to Appendix B for more information on the exact RS-232 cable that you need for your installation.

If you want to connect another type of device to the EMM, you can change the factory default terminal settings of the EMM as described at the beginning of Chapter 3.

Verifying Operation

This section explains how to verify module functionality.

1. The Status LED on the module should light and the Master Mgt Module LED should light if this is the master EMM (or the only management module in the concentrator).

2. The following message should display on the terminal screen once the module is installed properly and the RS-232 connection is made:

```
Ethernet Management Module (v4.00), Copyright (c) 1993  
Chipcom Corporation
```

The EMM Front Panel

The EMM has three LEDs on the front panel that indicate the status of the module, one button to reset the module, and one RS-232 serial port connector used to connect the EMM to a terminal or modem. Figure 2-3 shows the features of the EMM faceplate and Table 2-1 describes the LEDs.

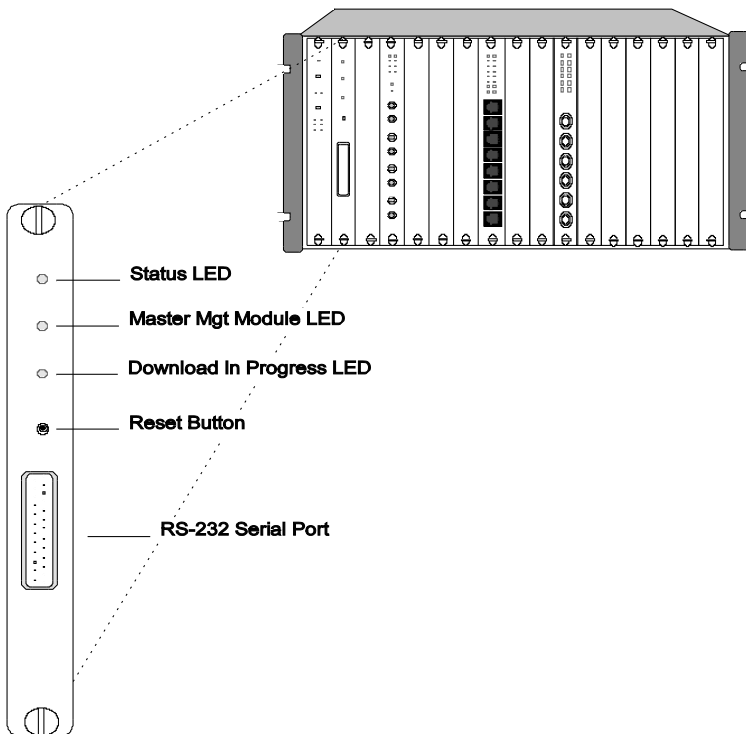


Figure 2-3. Ethernet Management Module Faceplate

Table 2-1. Interpretation of the Ethernet Management Module LEDs

LED Name	Color	State	Indicates
Status	Green	Off	Power off
		On	Power on
		Blinking	Error
Master Mgt Module	Green	Off	EMM is a slave
		On	EMM is a master
Download in Progress	Yellow	Off	Not downloading
		On	Downloading new software to EMM flash EPROM

Status LED

The Status LED displays a steady green glow to indicate that power is being provided to the EMM and that the EMM is working properly. This LED blinks when an error occurs during operation or if an error is found when diagnostics are performed during a reboot. Refer to Chapter 4, Troubleshooting, for a description of the error codes.

Master Mgt Module LED

The Master Mgt Module LED displays a steady green glow if this EMM is the master management module in the concentrator. It also displays a green glow while a mastership election is in progress and during initial installation. The LED is off when the EMM is a slave.

Download in Progress LED

The Download in Progress LED displays a steady yellow glow when software is being downloaded to the Flash EPROM on the EMM. See Chapter 5, Software Download Instructions, for details on downloading new software.

Note that you need the Firmware Distribution Kit3Com Firmware Distribution Kit (part number 5000-FDK) to initiate the download of new software provided in the Update Distribution Kit (part number 5101M-UDKx-x.xx).

Reset Button

The Reset Button resets the EMM and executes self-test diagnostic routines (network traffic is not affected). You should press this button *only* when you suspect problems with the EMM. The Reset Button is recessed to prevent an accidental reset, yet you can access it with a pen tip or a small screwdriver.

When the EMM is reset, it will come up under the last saved configuration parameters. Pushing this button has the same effect as issuing the RESET DEVICE command with one exception. Pushing the Reset button will cause any unsaved changes to be lost. Issuing the RESET command on an EMM after changes have been made but not saved causes a message to display warning you that unsaved changes exist. The RESET command aborts and cannot be executed until the SAVE command is issued.

RS-232 Serial Port

The 25-pin (DB-25) RS-232 serial port is a DTE male connector used to connect the EMM to a terminal or modem so you can enter management commands and download new software.

Where to go From Here

This chapter covered installation procedures for installing the EMM into a concentrator. Also provided were descriptions of the EMM front panel LEDs, RS-232 port, and the Reset Button. Now you are ready to set up your terminal for communication with the EMM and configure the EMM to begin managing your Ethernet network as explained in Chapter 3. If you encountered any problems with installing the module or the operation of the LEDs, refer to Chapter 4, *Troubleshooting*.

3 *Startup and Management Functions*

This chapter describes how to configure the EMM once you have completed the installation procedures outlined in Chapter 2. Included in this chapter is a quick reference chart for getting started. The remainder of this chapter is organized into the following sections:

- ❑ Configuring the Terminal
- ❑ Configuring the EMM
- ❑ Configuring SNMP Values
- ❑ Configuring Modules and Ports
- ❑ Configuring Address-to-Port Security
- ❑ Establishing Remote Logins
- ❑ Monitoring With SHOW Commands

The commands necessary to configure the EMM for operation are provided in this chapter. The EMM supports similar command conventions and keystroke functions as other ONline management devices. Refer to the *ONline Management Commands Guide* (17-00403) for complete information on all ONline management commands and command conventions.

Quick Reference for Getting Started

Table 3-1 outlines the steps and commands necessary to configure your EMM. The procedures and command examples are explained further throughout this chapter. If you are familiar with these instructions, you may want to use this table as a checklist.

Table 3-1. Quick Reference for Getting Started

Procedure	Command
1. Configure your terminal to default EMM communication settings	Refer to your terminal vendor's documentation
❑ Configure EMM Terminal Settings	SET TERMINAL HANGUP SET TERMINAL PROMPT SET TERMINAL TIMEOUT
2. Configure the EMM	
❑ Concentrator Configuration	SET CONCENTRATOR PLATFORM SET CLOCK
❑ Device Configuration (EMM)	SET DEVICE CONTACT SET DEVICE DIAGNOSTICS SET DEVICE LOCATION SET DEVICE NAME SET DEVICE PASSWORD
SNMP Configuration	SET COMMUNITY SET DEVICE DEFAULT_GATEWAY SET DEVICE IP_ADDRESS SET DEVICE SUBNET_MASK SET ALERT SET DEVICE TRAP_RECEIVE <i>(Advanced EMM only)</i>

Table 3-1. Quick Reference for Getting Started (Continued)

Procedure	Command
3. Module Configuration	SET MODULE MASTERSHIP_PRIORITY SET MODULE NETWORK SET MODULE RING_SPEED
4. Port Configuration	SET PORT SET PORT MODE SET SECURITY PORT (<i>Advanced EMM only</i>)
5. Save All Configuration Values	SAVE ALL
6. Monitor the Network and Device with SHOW commands	
<input type="checkbox"/> Device Information Module Information Port Information Concentrator Information Counter Statistics	SHOW DEVICE SHOW MODULE SHOW PORT SHOW CONCENTRATOR SHOW COUNTER MODULE SHOW COUNTER PORT
<input type="checkbox"/> EMM Traffic Statistics	SHOW COUNTER NETWORK

Saving and Reverting Configuration Values

When you make configuration changes using the SET command, they are effective immediately but are not saved permanently. To save commands permanently, use the SAVE command. Only *saved* values are in effect upon reset of the EMM or the concentrator. You can issue the SAVE ALL command to save all current concentrator configuration values previously established by the SET command for all categories. Or you may issue a specific SAVE command to save the configurations of only one group.

Use the REVERT command to restore the configuration values in effect at the time of the last save. Any unsaved changes made using the SET command are lost. The REVERT and SAVE commands support the same configuration groups as defined below.

- Alert
- All
- Community
- Concentrator
- Device
- Security
- Module_Port
- Terminal
- TFTP

Configuring the Terminal

The terminal that attaches to the serial port on the EMM must be configured to the same parameter settings as the EMM so the terminal and EMM can communicate. These settings include baud rate, data bits, parity, and stop bits. Initially, the terminal settings must match the factory default settings of the EMM as specified in Table 3-2. Consult the user's guide shipped with your computer terminal for instructions on how to set these values

Table 3-2. EMM Terminal Parameter Options and Factory Defaults

Parameter	Options	Factory Default
Baud	300, 1200, 2400, 4800, 9600	9600
Data_bits	7 or 8	8
Parity	odd, even, or none	none
Stop_bits	1 or 2	2

Once you have configured your terminal to match the factory defaults of the EMM, press [ENTER] and the following greeting is displayed:

```
Ethernet Management Module (v4.00) Copyright (c) 1993 Chipcom Corporation
```

Press [ENTER] again and the EMM prompts you for a password. Enter the password and then press [ENTER] (the default password is a null string). The following greeting and the default management prompt is displayed:

```
Welcome to system administrator service on ONline.  
ONline>
```

You are now logged in as the administrator with full access to all commands. Once terminal settings are complete, you can configure the ONline System Concentrator, the newly installed EMM, and all other ONline modules residing in the concentrator.

When you are done using the EMM, save all changes, and then log out of the system using the LOGOUT command. Provided you have saved all changes before issuing this command, you are logged out of the system and the following message displays:

```
ONline> logout      [ENTER]  
Bye
```

If you have made configuration changes and you have not saved those changes, the LOGOUT command prompts you as follows:

```
ONline> logout          [ENTER]
WARNING: Save unsaved changes before logout.
```

You must either SAVE or REVERT any changes you made to the system before you can successfully log out. Re-issue the LOGOUT command to log out of the system once you have saved or reverted.

Optional Terminal Settings

The EMM provides three additional terminal management commands that allow you to customize your terminal connection:

- terminal hangup
- terminal prompt
- terminal timeout value

These terminal settings are discussed in the following paragraphs. Also included in this section is the procedure to change the terminal's setting if you need to connect another device to the EMM that runs at a slower baud rate or different parity or data bits values than the factory settings.

Setting Terminal Hangup

If you use a modem connection to the EMM, you may want to use the SET TERMINAL HANGUP command to specify that the modem automatically hang up the connection to the terminal when you log out of the EMM. The factory default is disable, which means the modem will not automatically hang up when you log out of the connection. If you fail to hang up the modem connection, an unauthorized user may pick up the last login session.

Use the SET TERMINAL HANGUP command as shown to automatically hang up the modem connection once you log out of the EMM:

```
ONline> set terminal hangup enable      [ENTER]
```

Setting Terminal Prompt

It is a good idea to customize the management prompt for each EMM. This will remind you of the EMM to which you are connected in the case where you are logged into a remote EMM. The default management prompt is "ONline>" for all Hems. Use the SET TERMINAL PROMPT command as shown to customize your management prompt. 3Com recommends that you use the same identification to specify the terminal prompt and device name for your EMM.

```
ONline> set terminal prompt NEW PROMPT> [ENTER]
```

Setting Terminal Timeout

For optimum security, you should set the terminal timeout value to specify the amount of time you want your terminal to remain active during the absence of any keyboard activity. This feature is useful for keeping unauthorized users off the system if you leave your terminal without logging off. Once timeout has been set, the terminal will automatically log you off the system if there is no terminal (keyboard) activity for the period of time you have specified.

The default timeout value is 0, which means that no timeout has been set - you will never be logged off automatically. Use the SET TERMINAL TIMEOUT command as shown to set the timeout period. Note that the value specified is in minutes.

```
ONline> set terminal timeout 10 [ENTER]
```

Configuring the EMM

This section describes the commands necessary for startup and management of your concentrator and EMM. You need to define the following settings for your EMM:

- Passwords
- EMM Name

- ❑ Diagnostics
- ❑ Contact Name and Location

Use the following command to set the EMM's internal clock.

```
ONline> set clock 5:53 93/03/6 Saturday [ENTER]
```

Use the following command to define the concentrator platform for your EMM.

```
ONline> set concentrator platform {5006C} [ENTER]
                                     {5017C}
                                     {5006C-FT}
```

Note: Use the 5006C designation for all 6-slot concentrators.

Figure 3-1, Figure 3-2, and Figure 3-3 show an ONline 17-Slot System Concentrator, an ONline 6-Slot System Concentrator, and an ONline 6-Slot System Concentrator with Integrated Controller, respectively. As the names imply, there are 17 available slots (numbered from left to right) on the large concentrator and 6 slots (numbered top to bottom) on the smaller concentrators.

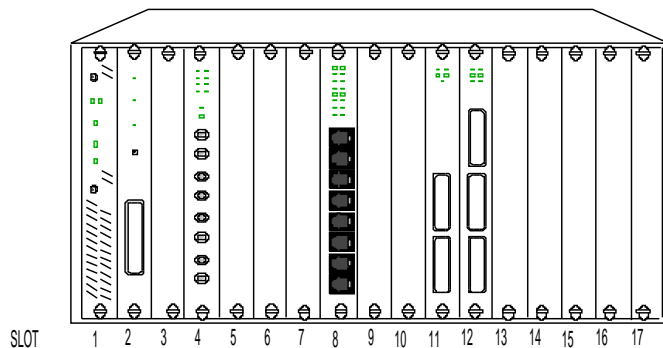


Figure 3-1. The 17-Slot ONline System Concentrator

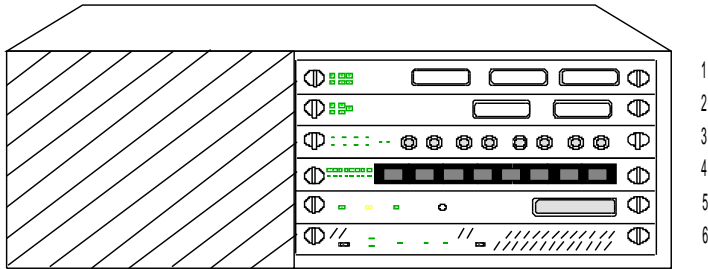


Figure 3-2. The 6-Slot ONLINE System Concentrator

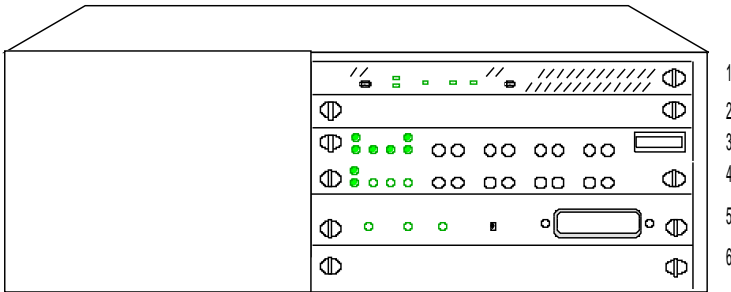


Figure 3-3. The 6-Slot ONLINE System Concentrator with Integrated Controller

Setting Device Password

The EMM provides two levels of password protection to protect against unauthorized access to the EMM console and possible network tampering.

- Administrator. The administrator password provides access to *all* EMM commands.
- User. The user password allows limited access to EMM commands enabling status and configuration displays only.

Both the administrator and the user password can be a maximum of 15 characters in length. Note that you must enter a password within 10 seconds following the display of the Password: prompt, or the terminal will display "Timeout." If this happens, press [CTRL] [R] to redisplay the SET DEVICE PASSWORD command. The new passwords you set go into effect immediately, but you must issue the SAVE DEVICE (or SAVE ALL) command to save the new passwords.

Establishing the Administrator Password

Use the following command to establish the administrator password.

```
ONline> set device password administrator [ENTER]
Enter current administrator password: {old password} [ENTER]
New password: {new password} [ENTER]
Verify: {new password} [ENTER]
```

Note: For security purposes, the values you enter in the password fields are not displayed on the screen.

You do not need to use the new administrator password until the next time you log in to the EMM.

As EMM administrator, you can configure the following:

- ❑ **Device** - This includes naming the EMM, establishing passwords, setting mastership priority, setting SNMP Values, as well as providing location and contact information.
- ❑ **Modules** - The EMM can assign each module in the ONline System Concentrator to one of the available networks or isolate it (not connect that module to any network). Reconfiguration of network assignments can be done at any time, without removing a module from the concentrator or disrupting other configuration settings. If a module is removed from the concentrator slot and replaced with the same module type in the same slot, the new module will be configured to the settings of the previous module installed in that slot.

- ❑ **Ports** - The EMM can assign each port on a per-port switching ONLINE module to one of the available networks. Reconfiguration of network assignments can be done at any time, without removing the module from the concentrator or disrupting other configuration settings.
- ❑ **Override Control** - The EMM can override all ONLINE module dip switch settings.
- ❑ **Terminal** - EMM terminal configuration values can be modified to meet your particular application requirements.
- ❑ **Security** - The EMM address-to-port security feature enables you to assign a maximum of four MAC addresses to a port. Whenever a device assignment is changed, the EMM is alerted to the change in MAC Address, sends a trap to the designated workstation, and automatically disables that port.
- ❑ **Fault Tolerance** - The EMM can assign the ports of some modules (e.g., Fiber Module, 10BASE-T Module) as redundant pairs in order to provide fault-tolerant links between concentrators or between devices (when using Fault-Tolerant Transceivers).

Establishing the User Password

Use the following command to establish a user password. Note that you must be logged in as administrator to change the user password. The default user password is [ENTER].

```
ONline> set device password user      [ENTER]
Enter current administrator password: {administrator password} [ENTER]

New password:                          {new user password} [ENTER]
Verify:                                  {new user password} [ENTER]
```

Assigning an EMM Name

To make identification of your EMMs easier, 3Com recommends that you assign a unique name to each EMM. You can then use this name instead of the IP address or MAC address to refer to a particular EMM. Use the SET DEVICE NAME command as shown to assign a unique name to your EMM. The EMM name can be a maximum of 31 characters.

```
ONline> set device name EMM3 [ENTER]
```

3Com recommends that you use the same identification to specify the terminal prompt and the device name for your EMM.

Setting Device Diagnostics

When the EMM is reset (or rebooted) using the factory default settings, the module performs a full diagnostic check of itself and then sets all the modules to the appropriate settings. You have the option to disable the diagnostics if you want the EMM to boot up faster. Use the SET DEVICE DIAGNOSTICS command as shown to bypass the diagnostics.

```
ONline> set device diagnostics disable [ENTER]
```

Assigning a Contact Name and Location

The EMM enables you to enter the name of an appropriate service contact and the concentrator location. Use the SET DEVICE LOCATION and SET DEVICE CONTACT commands as shown to identify the location of the EMM and the name of the person responsible for EMM operation. These commands allow you to enter one line of free format text up to 78 alphanumeric characters in length. Note that you must enter the line of text within 15 seconds of receiving the prompt or the command will timeout.

```
ONline> set device location [ENTER]
```

```
ONline> set device contact [ENTER]
```

Configuring SNMP Values

SNMP (Simple Network Management Protocol) is a protocol defined by the Internet community. All TCP/IP-type traffic is encapsulated in Ethernet frames. The EMM supports SNMP by responding to SNMP requests and generating SNMP traps. An EMM acts as an agent in an SNMP- managed environment, enabling you to configure your EMM and all modules in the concentrator through SNMP. It has a community table that can contain up to 10 IP addresses.

An IP Address entry in a community table may have one of the following attributes assigned:

- **read-only** allows the specified IP address to read SNMP variables via the SNMP GET command
- **read-write** allows the specified IP address to read and write SNMP variables via the SNMP GET and SNMP SET commands, respectively
- **trap** sends a trap to the specified IP address when an SNMP variable is changed
- **read-trap** allows the specified IP address to read SNMP variables and receive traps
- **all (read-write, and trap)** allows the specified IP address to read SNMP variables, change the variables via the SNMP SET command and receive traps whenever an SNMP variable is changed.
- **oldtrap** access means that the IP Address you specify will receive alerts from the EMM based on the 3Com MIB I.
- **read_oldtrap** access means that the IP Address you specify can display information about the EMM and it will receive alerts based on the 3Com MIB I.
- **oldall** access means that the IP Address you specify has read_write and trap access to the EMM based on the 3Com MIB I.

Note: When you use the IP Address entry of **all**, you cannot use **trap**, **read_trap**, or **all** access.

The three "old" trap options should be used when sending traps to workstations using the 3Com MIB I variables. All the non-"old" trap options should be used when sending traps to workstations using the 3Com MIB II variables.

An EMM sends alarms to those IP addresses in the community table having either *trap*, *read-trap*, or *all* attributes. The EMM and all modules in the concentrator can be configured via SNMP from stations having IP addresses with either *read-write* or *all* attributes. Finally, the EMM can be monitored from stations having IP addresses with *read-only*, *read-write*, *read-trap*, or *all* attributes.

An EMM can receive SNMP alarms from SNMP devices on the network (including itself) once the EMM's IP address and accompanying attributes have been added to the community table of the SNMP device generating the alarms, and the SET ALERT feature is enabled.

For example, if a major fault condition causes a port to be disabled, an SNMP alarm is generated and displays to the terminal or workstation. This feature enables you to analyze network information simply by accessing a single EMM instead of having to be at the network management workstation.

If you plan to manage your concentrator through an SNMP workstation, you must set the following attributes for the EMM:

- IP Address
- Community Table
- Alerts
- Subnetwork Mask
- Trap Receive
- Default Gateway

Assigning IP Addresses

To run SNMP properly, every device on your network must have a unique IP address. Use the SET DEVICE IP_ADDRESS command as shown to assign an IP address for the EMM on network 1. Note that you can set separate IP addresses for each of the individual networks on the concentrator backplane.

```
ONline> set device ip_address 195.36.58.27 network_1 [ENTER]
```

Creating a Community Table

The community table defines which SNMP stations on the network can access information from the EMM and which station(s) will receive a trap from the EMM when the EMM detects an error. For example, the following command adds a community name of NCS with IP Address 195.36.58.217 to have read_write access:

```
ONline> set community NCS 195.36.58.217 read_write [ENTER]
```

Note that community entry names *are* case-sensitive. For example *NCS* and *ncs* are different community names. Use the SHOW COMMUNITY command to view existing community entries.

Configuring the Alert Setting

The SET ALERT command enables or disables the feature used to send an alert to the management workstation. The following command enables the alert feature. Therefore, when a configuration change is made to the concentrator via SNMP, an alert will be sent to the management workstation.

```
ONline> set alert change enable [ENTER]
```

Refer to the SET ALERT command in the *ONline Management Commands Guide* for information on the different types of alerts available through this command.

Setting a Subnetwork Mask

The subnetwork mask is specific to each type of Internet class. Generally, the subnetwork mask is a group of common characters appearing on the left side of an IP Address (called the Network ID), while the host address is the group of unique characters appearing on the right side of an IP Address. For example, to set the subnetwork mask for a class C address without subnetworks, enter the following command:

```
ONline> set device subnet_mask FF.FF.FF.00 all [ENTER]
```

The subnetwork mask for a class B device without subnetworks would be set using the following command:

```
ONline> set device subnet_mask FF.FF.0.0 network_1 [ENTER]
```

Note that you can set separate subnetwork masks for each of the individual networks on the concentrator backplane, or the same subnetwork mask for all of the networks on the concentrator backplane.

Defining the Default Gateway

The default gateway is the IP Address of the gateway that receives and forwards packets whose addresses are unknown to the local network. The default gateway is useful when sending EMM alert packets to a management workstation on a different network. For example, the following command specifies that the gateway with address 195.3.6.58 is to become the default gateway:

```
ONline> set device default_gateway 195.3.6.58 all [ENTER]
```

Note that you can set separate default gateways for each of the individual networks on the concentrator backplane, or the same default gateway for all of the networks on the concentrator backplane.

Enabling Trap Receive

The *Advanced* version of EMM software provides you with the ability to set the EMM as a trap receiver. As a trap receiver, the EMM receives traps from other SNMP devices that have the EMM's IP address in their community table.

Use the following command to enable an EMM to function as the trap receiver for other SNMP devices on the network.

```
ONline> set device trap_receive enable [ENTER]
```

Note: You must add the EMM's IP Address to a device's community table in order for that device to be able to send traps to the EMM.

Configuring Modules and Ports

This section describes how to assign the EMM and media modules to an Ethernet network and how to configure ports. Also discussed is the importance of setting the appropriate mastership priority level for your EMM. Appendix B of the *ONline System Concentrator Installation and Operation Guide* provides a chart to record the values you set for modules in your concentrator.

Assigning Module Networks

Modules assigned to the same network form a segment. Modules assigned to different networks cannot communicate with each other unless the networks are bridged. All ONline modules, except the Fault-Tolerant Controller Module and the Token Ring MAU Module can be assigned to a network. The Controller Module does not require a network assignment as it only connects to the control bus and the Token Ring MAU Module is connected through its trunk or Ring In/Ring Out ports.

If you isolate a module, the isolated module cannot send or receive any traffic from other modules in the concentrator. Initially, all ONline modules are factory-set to network 1, but will come up isolated if a management module is installed in the concentrator.

Use the following command to assign the Ethernet module in slot 7 to network ethernet_1:

```
ONline> set module 7 network ethernet_1 [ENTER]
```

Assigning Module Mastership Priority

All ONline management modules are shipped from the factory with a mastership priority level of 10. Ten is the highest priority. When multiple management modules reside in the same concentrator, the SET MODULE MASTERSHIP_PRIORITY command enables you to establish one of the modules as master management module and all other modules as slaves.

An EMM master manages the network to which it is assigned, controls all configuration, and supplies all fault-detection capabilities for the entire concentrator. A slave management module can only listen to its assigned network's activity. Both master and slaves can collect statistics on *only* one network at a time.

The first EMM you place in a concentrator should maintain the default mastership priority level of 10. Once installed, the priority levels of all other EMMs should be changed to a different mastership priority level.

Use the following command to set the EMM in slot 3 to mastership priority 10:

```
ONline> set module 3 mastership_priority 10 [ENTER]
```

Once mastership priorities are assigned, you must issue the RESET MASTERSHIP command to initiate an election. During an election, the management module with the highest assigned mastership priority becomes the master. The new mastership setting is in effect immediately, but you must use the SAVE MODULE_PORT command to save this priority permanently.

Note: When you power up a concentrator in which more than one management modules is set to priority level 10, one management module is randomly chosen as master. 3Com recommends that you assign priority level 10 to only one management module in the concentrator.

Setting Port Mode

Use the SET PORT command to enable port 1 on the module in slot 3:

```
ONline> set port 3.1 mode enable [ENTER]
```

Setting Port Network

Use the SET PORT NETWORK command to assign a port to a specific network. This command applies to 3Com modules (e.g., the ONline Ethernet Bridge Module) where individual ports are network-selectable. This example assigns port 1 on the module in slot 7 to network ethernet_3.

```
ONline> set port 7.1 network ethernet_3 [ENTER]
```

Setting Redundant Ports

Use the SET PORT MODE REDUNDANT command as shown to set redundancy between port 1 on the module in slot 5 to port 2 on the module in slot 7.

```
ONline> set port 5.1 mode redundant 7.2 [ENTER]
```

Configuring Address-to-Port Security

The Advanced EMM provides address-to-port security which enables you to assign a maximum of four MAC Addresses to individual ports in your network. This allows the EMM to detect a change in the MAC Address of a station connected to a port whenever a different device is connected to that port. When a master EMM detects such an address change, it disables the port to preserve network security, and sends a trap to all stations with *trap* or *all* access in its community table.

A slave EMM (Advanced) can also detect a change in a port's MAC address. The slave EMM will send a trap to all stations in its community table, however, it cannot disable the port. Once you are alerted to the trap (displayed on the EMM console or workstation), you must issue the SET PORT MODE DISABLE command to disable the port.

Once you have determined and rectified the intruding station, you must issue the SET PORT MODE ENABLE command to re-enable the port.

Note: All versions of the EMM (i.e., Starter, Basic, Advanced) are capable of managing the ONline 10BASE-T Security Module. However, only the Advanced EMM supports management security features. Therefore, when you use a Starter or Basic EMM to issue a security command using the 'all' option, the EMM scans the concentrator for Security Modules and initiates the command on Security modules only.

When you use an Advanced EMM to issue a security command using the 'all' option, the EMM will initiate the command on all Ethernet modules that support security.

To implement port security, assign a MAC Address to a given port *before* you enable the security feature for that port.

Issue the following command to assign a MAC Address to port 3 on the module in slot 6:

```
ONline> set security port 6.3 mac_address 08-00-8f-12-c0-09 [ENTER]
```

Use the following command to enable the security feature for all ports on the module in slot 7. Prior to enabling the security feature, you must already have assigned a MAC Address to each port:

```
ONline> set security port 7.all mode enable [ENTER]
```

Use the SHOW SECURITY PORT command to display the MAC address and security setting for a specific module and port, for all ports, or for all port's of a specific module.

The following example displays security settings for all of the ports on the Fiber Module in slot 16.

```
ONline> show security port 3.all verbose [ENTER]
```

```
Security Display for Module 5104M- FB in Slot 3:
```

<u>Port</u>	<u>Mode</u>	<u>MAC Addresses</u>	<u>General Information</u>
16.01	ENABLED	08-00-8f-1b-0b-ad	ETHERNET_1
16.02	ENABLED	08-00-8f-3c-c6-1e	ETHERNET_1
16.03	DISABLED	08-00-8f-00-0e-c6	ETHERNET_1
16.04	DISABLED	08-00-8f-00-0e-2e	ETHERNET_1

Managing Security with EMM Master and Slaves

When managing security in Ethernet modules (other than the 5112M-TPLS Security Module), 3Com recommends that all security configuration changes to an Ethernet module only be issued through the EMM (master or slave) that is managing the network to which that module is assigned. This eliminates the possibility of having two different security configurations for one module stored in two EMMs. (This consideration does not apply to the Security Module because only a master EMM is capable of managing it.)

By following this guideline, you will avoid having security configuration information restored incorrectly in the unlikely event both the master EMM and concentrator power fail concurrently, with at least one slave EMM in the concentrator. In this scenario, the slave will power up and become master, and will configure a module's security settings according to the information stored in its memory. This information may be different than the previous master EMM's information if you made security configuration changes using the slave rather than the master.

Establishing Remote Logins

The TELNET command and the REMOTE_LOGIN command enable you to log in remotely to any EMM on the network, and to manage the network remotely (from a terminal attached to a remote EMM, or from a workstation with Telnet support). You can manage an EMM across any number of bridges and routers.

You must be logged into the local concentrator before you can issue the TELNET command or the REMOTE_LOGIN command. Once you are connected to the remote EMM, you must enter that EMM's password. Then, all the commands you issue are for that EMM and are identical to those issued under a local login.

As shown in Figure 3-2, once you are connected to the EMM in Concentrator C, you can remotely log in and manage the EMMs in Concentrators A and B.

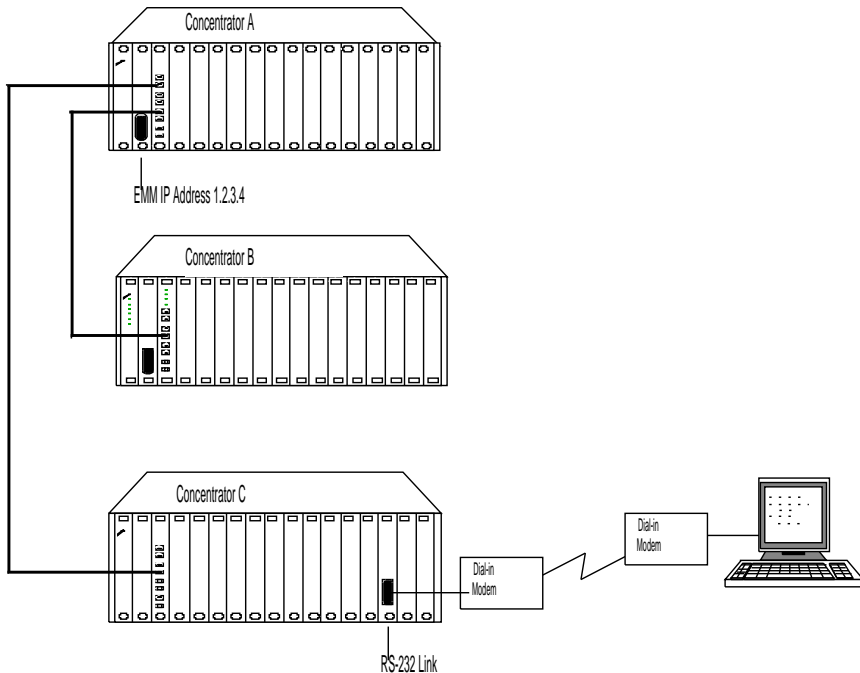


Figure 3-4. Sample Remote Connection

Use the TELNET command and specify the IP Address of the remote device to which you want to connect.

```
ONline> telnet 127.3.6.58 [ENTER]
```

Note that you are only allowed one Telnet login session per EMM. Therefore, it is not possible to be logged into Concentrator A *and* Concentrator B (in Figure 3-2) simultaneously.

Use the REMOTE_LOGIN command and specify the EMM name, IP address or MAC address of the remote EMM to which you want to connect.

```
ONline> remote_login 127.3.6.58 [ENTER]
```

Refer to the *ONline Management Commands Guide* for a complete description of the TELNET and REMOTE_LOGIN commands.

Logging Out From a Remote Session

When you no longer need to be connected to a remote device, enter the LOGOUT command. This command disconnects the remote connection and reconnects the session with the local EMM. Once this is done, the local management prompt returns to the local screen.

If TIMEOUT has been set for the remote EMM and the time runs out, you will be logged out of the remote EMM and returned to the local EMM. Unsaved changes are still in effect, but they will be lost if the EMM is reset. To save these changes, re-establish connection to the EMM and issue the SAVE command.

Monitoring With SHOW Commands

The EMM enables you to display device (EMM), module, port, and concentrator configuration settings using the SHOW commands.

Showing Device Information

Use the SHOW DEVICE command to view the current EMM information.

```
ONline> show device [ENTER]
3Com Advanced Ethernet Management Module (5101M-MGTA)
v4.00.0 AgentOS SNMP
Name: Online
Location: Wiring Closet 3
For assistance contact: Network Administrator
Boot EPROM Version: v3.2      Serial
Number: 850836  Restarts: 7
Flash EPROM Version: v4.00-A  Service Date: 93/06/16
Network      IP Address      Subnet Mask      Default Gateway
1 *           151.104.002.205    FF.FF.00.00       151.104.002.001
2             151.104.006.214    FF.FF.00.00       151.104.006.001
3             151.104.006.214    FF.FF.00.00       151.104.006.001
```



```
MAC Address: 08-00-8F-10-6B-B3
Dip Configuration: DISABLED   Diagnostics:   ENABLED
Trap Receive:      ENABLED
```

Showing Module Information

Use the SHOW MODULE ALL command to view information about all of the modules currently installed in the concentrator:

```
Online> show module all           [ENTER]

Slot  Module    Version  Network    General Information
01      5000M-RCTL xx      N/A         Active Redundant Controller
03      5104M-FBP  xx      ETHERNET_1
05      5108M-TP  xx      ISOLATED
*15     5101M-MGT xx      ETHERNET_1 Master Management Module
```

In this example, slot 1 contains the Controller Module, slot 3 contains a Fiber Module on network 1, slot 5 contains a 10BASE-T Module that is isolated from the backplane networks, and slot 15 contains a master EMM on network 1.

For additional information about a module, issue the SHOW MODULE VERBOSE command. The example below displays more detailed information about the EMM in slot 15.

```
Online> show module 15 verbose     [ENTER]

Slot  Module    Version  Network    General Information
*15     5101M-MGT xx      ETHERNET_1 Master Management Module

5101M-MGT: Online Ethernet Management Module

Mastership_priority:           10
Station Address:               08-00-8F-10-6B-B3
```

Showing Port Information

The EMM enables you to display the status of all module ports. Use the SHOW PORT command to display the mode and status of one port or all ports. Use the VERBOSE option as shown to display detailed information about a specific port.

```
ONline> show port 16.1 verbose [ENTER]
```

```
Port Display for Module 5104M-FBP:
```

<u>Port</u>	<u>Mode</u>	<u>Status</u>	<u>Network</u>	<u>General Information</u>
16.01	DISABLED	LINK FAILURE	ETHERNET_1	

Port Alert Filter:	DISABLED
Port Connector:	FIBER
Mode Dip Setting:	ENABLED

Issue the SHOW PORT ALL command to display information for all ports on a four-port Fiber Module installed in slot 3.

```
ONline> show port 3.all [ENTER]
```

```
Port Display for Module 5104M-FBP:
```

<u>Port</u>	<u>Mode</u>	<u>Status</u>	<u>Network</u>	<u>General Information</u>
03.01	ENABLED	OKAY	ETHERNET_3	
03.02	ENABLED	LINK FAILURE	ETHERNET_3	Port is down
03.03	ENABLED	OKAY	ETHERNET_3	
03.04	ENABLED	OKAY	ETHERNET_3	

Showing Concentrator Information

The SHOW CONCENTRATOR command reports the status of the primary and backup power supplies and temperature status for that concentrator.

```
ONline> show concentrator [ENTER]
```

```
Concentrator Information:
```

```
Concentrator Type: 5017C
```

```
Primary power supply status: NORMAL
```

```
Backup power supply status: NORMAL
```

```
Temperature sensor status: NORMAL
```

Showing Counter Statistics

Once the EMM is assigned to a network, it continuously records and updates traffic and error statistics on all Ethernet stations, ports, and the network to which it is assigned. The SHOW COUNTER command can be issued for a module, port, or network.

Issue the SHOW COUNTER command to display the total traffic and error statistics recorded since either a module or port was first installed, or since the last time the counters were cleared (using the CLEAR COUNTER command).

Use the SHOW COUNTER MODULE command as shown to display traffic and error statistics for the module in slot 3.

```
ONline> show counter module 3      [ENTER]
Non-zero counters for network ETHERNET_1 on 09 Aug 93:
Slot      Frames      Bcast      CRC Err      AlignErr      Collisions
Time      Octets      Mcast      TooLongErr
-----
  3        1500        500          0          162           3
18:17:12  9000       1325          0
```

Use the SHOW COUNTER PORT command as shown to report traffic and error statistics for the ports on module 3.

```
ONline> show counter port 3.all    [ENTER]
Non-zero counters for network ETHERNET_1 on 09 Aug 93:
Slot.Port  Frames      Bcast      CRC Err      AlignErr      Collisions
Time      Octets      Mcast      TooLongErr
          LastSourceAddr      Changes      LastErrorAddr
-----
  3.1      1200        350          0          12           1
18:16:28  8600        125          0
          08-34-8e-41-20-50      13          08-12-03-3e-74-06
  3.2      150         75          0          75           1
18:16:28  200         600          0
          08-04-23-15-10-67      4          08-40-65-8e-30-32
  3.3      150         75          0          75           1
18:16:28  200         600          0
          08-75-34-05-30-8d      7          08-35-46-75-60-32
```

Use the SHOW COUNTER NETWORK command as shown to report traffic and error statistics for the network to which the EMM is assigned.

```
ONline> show counter network          [ENTER]
Non-zero counters for network ETHERNET_1 on 9 Aug 93:
Network   Frames   Bcast   CRC Err   AlignErr   Collisions
Time      Octets   Mcast   TooLongErr   Remote/Local
-----
ETHERNET_1   928     21      0         1         16502
13:24:47   74129   129     0         0         51
```

Using the MONITOR Command

The EMM can be set to continuously monitor and report key network statistics by invoking the MONITOR command. The statistics on the screen are updated periodically to give you a snapshot of the network activity. The information displayed by the MONITOR command is *current*, rather than cumulative.

Use the MONITOR command to periodically report current network statistics for the EMM (the frequency of reporting is determined by the time, expressed in minutes, that you request). Note that the MONITOR command reports the same information as the SHOW COUNTER NETWORK command except that the system reports only on the events occurring for the time you specify.

Where To Go From Here

This chapter described how to configure your EMM to suit your specific network requirements, as well as how to display information about your EMM, ONline modules and ports, and the ONline System Concentrator in which the modules are installed. The next chapter, Troubleshooting, provides troubleshooting suggestions for isolating and correcting problems that may arise during the installation process and normal operations of the ONline Ethernet Management Module.

4 *Troubleshooting*

This chapter provides help in isolating and correcting problems that may arise during the installation process and normal operations of the ONline Ethernet Management Module (EMM). It is divided into the following sections:

- ❑ Applying Power
- ❑ EMM and Terminal Interface
- ❑ EMM Trap and Error Messages
- ❑ Technical Assistance
- ❑ EMM Network Impact

Applying Power

Under normal conditions, when you install the EMM, the Status LED and the Mastership LED turns on. The Mastership LED remains on if the EMM is elected master. Table 4-1 lists some of the common problems that may arise when installing your EMM, and their solutions

Table 4-1. Applying Power Suggestions

Problem	Troubleshooting Suggestions
Power is on, but the Status LED does not light.	Press the LED check button on the Controller Module to verify that the LED is not burned out. All the LEDs should light.
	Verify that the EMM is installed correctly by following the installation instructions in Chapter 2.
	Try the EMM in another slot in the concentrator.
	Press the reset button on the EMM.
	If the LED still does not light, the software on the Flash EPROM may be corrupted, Try downloading a new copy of the software as described in Chapter 5.
	If downloading software does not solve the problem, call your supplier for assistance.
The Status LED is blinking, failing diagnostics.	Try the suggestions for the previous problem.

Table 4-1. Applying Power Suggestions (Continued)

Problem	Troubleshooting Suggestions
Master Mgt LED not lit.	Check if another EMM in the concentrator is master.
	If there is only one EMM in the concentrator, verify that it is set to a mastership priority of 10 (using the SHOW MODULE {slot} VERBOSE command) and then press the reset button on the EMM.
	Try the suggestions for the previous problem.

EMM and Terminal Interface

Follow the directions in Chapter 2 for attaching your terminal to the EMM using the RS-232 serial port connector. Table 4-2 lists some common problems that may occur when trying to get the EMM to communicate with the terminal.

Table 4-2. EMM Terminal Interface Suggestions

Problem	Troubleshooting Suggestions
Nothing appears on the screen.	Make sure the RS-232 cable meets the specifications detailed in Appendix B.
	Make sure the RS-232 cable is securely connected to both devices. See Chapter 2 for installation instructions.
	Verify that the baud rates match for the terminal and the EMM.

Table 4-2. EMM Terminal Interface Suggestions (Continued)

Problem	Troubleshooting Suggestions
Characters appear on the screen, but are garbled.	Verify that the EMM and the terminal settings match for baud, data bits, stop bits, and parity. These values are explained in Chapters 3.
The SET command doesn't work.	Make sure you are logged in as the Administrator and that you are connected to the master EMM.
Abbreviated input is used and pressing [SPACE] does not complete the input.	Enter enough characters for the EMM to distinguish between different commands and options.
Random characters are lost.	Set the flow control on the terminal to XON/XOFF.
Characters are lost when connected to the EMM through a modem.	Make sure the STOP_BITS value on the terminal is set to 2 STOP_BITS.
The management prompt on the screen is not as you set it.	You may be connected to a remote device. Refer to the REMOTE_LOGIN and LOGOUT commands.
Power up (switchover) brings up a different configuration than the one last set.	Make sure you SAVE your configuration changes. Verify that the DIP_CONFIGURATION setting is disabled by using the SHOW DEVICE command.
You are not receiving any statistics from the concentrator.	Check that the EMM and the modules in the concentrator are not isolated.

Table 4-2. EMM Terminal Interface Suggestions (Continued)

Problem	Troubleshooting Suggestions
The Master MGT Module LED blinks sporadically.	Check for multiple EMMs and verify that only one has been set to a mastership level of 10.
The >> prompt appears on the screen.	The EMM is running in maintenance mode. Type BOOT to return to management mode and the ONline> prompt.

EMM Trap Messages

A trap message is sent to the console when a change is made or an error occurs in a concentrator that has an installed EMM. The trap is also sent to the designated trap receiver (e.g., management workstation) if you have entered this information in the EMM community table. For example, if a module is removed from a concentrator, a message that describes the change is sent to the console, as shown below:

```
Message received from this device on 15:28 Mon 09 Aug 93:
Enterprise:      Chipcom
Enterprise Specific Trap:      Slot Down
Message Information:
  Slot Number:      6
  Module Type Number:  6
  Module Description: 5108M-TP
```

The first two fields in the trap message are described in Table 4-3. The remainder of the fields are dependent on the type of trap received and are self-explanatory.

Table 4-3. EMM Trap Message Fields

Field	Description
Enterprise	Describes the enterprise (organization) responsible for this type of trap message.
Enterprise Specific Trap	One of the following trap messages: <i>Slot Up or Slot Down</i> <i>Port Up or Port Down</i> <i>Trunk Up or Trunk Down</i> <i>Fatal Error</i> <i>Environment Change</i>

SNMP traps are also sent to the EMM console when they occur. An example of an SNMP trap would be when a device attempts to gather information (read) from the EMM, but the address of the device has not been added to the community table with that access level. The message that would appear in this instance is shown below:

```
Message received from this device on 15:28 Tues 08 Jun 93:
Enterprise:      Chipcom
SNMP Generic Trap:  SNMP Authentication Failure
```

You also have the option of disabling traps. Use the SET ALERT PORT_UP_DOWN DISABLE command as described in the *Online Management Commands Guide* to disable traps slot up/down traps.

Technical Assistance

You can receive assistance for installing and troubleshooting the EMM by calling either your 3Com reseller or 3Com Technical Support. Be prepared to supply a representative with the following information:

- Description of the problem
- Steps you have taken to try and correct the problem
- Type and software version of the ONline network management module being used
- Version of software installed on your EMM
- Status of the front panel LEDs
- Screen information (if available)
- Configuration of your concentrator
(you may find it helpful to refer to the Slot Usage Chart in Appendix B of the *ONline System Concentrator Installation and Operation Guide* for a record of this information)

Refer to Appendix D for instructions how to contact Technical Support for your product.

EMM Network Impact

This section describes the impact of the Ethernet Management Module (EMM) on the network. It is designed to help the network administrator identify the source of packets on the network. Specifically, this section will help identify 3Com generated packets.

The EMM generates packets on the network (channel) in the following three instances:

- ❑ When establishing and maintaining a remote login session (RCP or Telnet session).
- ❑ When resolving a name tag (or IP Address) to a network address (TAG, ARP).
- ❑ When the EMM is configured to support SNMP, and send Alert messages.

In all other cases, the EMM does not generate any network activity. Traffic statistics are collected by operating in promiscuous mode, that is, listening to each packet on the network. Management of the other modules in the concentrator is accomplished by utilizing a separate control bus on the ONline backplane.

Note that when the EMM is isolated from the backplane, it cannot generate, nor receive, any Ethernet traffic.

3Com Protocols

In order to support the remote login mechanism, 3Com has defined a thin protocol layer called RCP (Remote Character Protocol). This protocol uses the IEEE 802.2 link control layer protocol. This implies that remote login sessions can exist across bridges, but not across a router.

Also, 3Com has defined a support protocol similar to ARP that resolves names to addresses. This "tag resolution" occurs when a user initiates the REMOTE_LOGIN or PING command, using the EMM name.

The entire 3Com protocol packet is structured as follows:

802.3 Header	802.2 Header	3Com Protocol Header	Data
--------------	--------------	----------------------	------

The 802.3 Header is defined by IEEE and consists of:

- Destination (MAC) address (6 octets)
- Source (MAC) address (6 octets)
- Enet Type (2 octets)

XX-XX-XX-XX-XX-XX	XX-XX-XX-XX-XX-XX	SIZE-14	
-------------------	-------------------	---------	--

The 802.2 Header is defined by IEEE and consists of:

- Destinations SAP (1 octet)
- Source SAP (1 octet)
- Type (1 octet)
- Protocol ID (3 octets)

0xAA (SNAP)	0xAA (SNAP)	0x03 (UI)	0x08008F (3Com)
-------------	-------------	-----------	-----------------

The 3Com Protocol Header is defined by 3Com and consists of:

- Protocol ID (2 octets)

0x81b1 (RCP) For Remote Character Protocol

or

0x81b2 (RTAG) 0x81b2 (RTAG) For Tag Resolution

As stated earlier, tag resolution is initiated to resolve a 3Com name to a network address. This occurs when the name is used in the REMOTE_LOGIN and the PING commands.

3Com also uses the Internet defined protocol, ARP (Address Resolution Protocol). This protocol is used in a similar fashion to the tag resolution protocol, except that it is used to resolve an IP address to a network address.

RCP, or the 3Com remote character protocol is used to support the remote login session. The protocol defines a master/slave relationship between the device initiating the login session and the device supporting the session. Terminal characters are separately sent between the master and slave. Upon command completion, the slave sends the output of the executed command.

RCP also maintains an underlying protocol to determine if the login session is still active. Basically, the master pings the slave once a minute. After the timeout period passes without a successful ping, the remote session is aborted.

5 *Software Download Instructions*

This chapter explains how to download new software to the Flash EPROM in your ONline Ethernet Management Module (EMM). 3Com Corporation provides new software to registered Software Subscription Service users when new features or enhancements are available for the module.

You can download software either through an out-of-band connection, which requires that your terminal be connected directly to the module RS-232 port, or through an inband connection, which downloads the code from a file stored on a local file server. An inband download is available only using the advanced software version of EMM.

This chapter is divided in to the following sections:

- ❑ Download Requirements
- ❑ Out-of-Band Download Instructions
- ❑ Inband Download Instructions
- ❑ Troubleshooting

Download Requirements

A UDK key code is required to complete a software download to the EMM. UDK key codes are usually provided with the UDK. However, you will need to request a key code from 3Com if the key code is not provided on the UDK package. If you need to request a key code from 3Com, locate the fax form in the UDK shipment. Complete this form and fax it to 3Com so that a Customer Service Representative can assign the proper key for your EMM.

The following download components are required before you can perform a download:

- ❑ You must have the 3Com Firmware Distribution Kit (Part Number 5000-FDK) required for out-of-band downloads only. The FDK includes:
 - ProComm™ Reference Manual (from Datastorm Technologies, Inc.) shrink-wrapped with:
 - ProComm diskettes (3 1/2" disks)
 - ProComm software license
 - 3Com 3 1/2" diskettes
 - 10 ft. RS-232 crossover cable (refer to Appendix B for the cable pin assignments)
 - 25-pin to 9-pin adapter
- ❑ You must have the ONline Ethernet Management Module Update Distribution Kit from 3Com - Part Number 5100U-xxL-x.xx (limited, single use license) or 5100U-xxU-x.xx (unlimited, site license), including:
 - 3Com 3 1/2" diskettes (two sets for site license)
 - 3Com software license
 - The new user manual for the module (four manuals for site license)
 - Release Notes

- ❑ IBM PC/AT or compatible with either one high-density diskette drive and a hard drive, or two high-density diskette drives
- ❑ 640K of available RAM on the PC
- ❑ 3Com UDK Key Code. The key code is provided automatically with the UDK for SSS customers. If not already provided, the key code may be obtained by faxing the UDK fax form to 3Com.



Caution: The PC used to download the new software must not be running any background RAM processes, such as electronic mail systems, because they interfere with the download procedure.

How the FDK and UDK Process Works

The 3Com Firmware Distribution Kit (FDK) makes system upgrades fast and easy for all 3Com products that are equipped with Flash PROMs. The first time you update the software requires that you purchase both the FDK and the product UDK. All subsequent updates require that you purchase only the new version of the UDK; you can re-use your original FDK.

When 3Com issues a software upgrade, we send the upgrade on diskette (UDK) to all registered users who order the upgrade or to all customers who have signed up for the Software Subscription Service (SSS). SSS is explained in more detail in the Preface of this manual. The upgrade takes only two or three minutes using an inband download or ten to fifteen minutes for an out-of-band download, after which time the EMM will be up and running the new version of software.

Out-of-Band Download Instructions

The instructions for performing an out-of-band download to the Ethernet Management Module are divided into the following steps:

- ❑ Install the ProComm Software
- ❑ Connect the RS-232 Cable
- ❑ Download the New Software

Installing the ProComm Software

This step installs and configures ProComm software on your PC hard disk or onto the FDK diskette if you are using a two-floppy system. The files are installed in the subdirectory PROCOMM which is created on the hard drive or on the FDK diskette.

Follow the instructions below to install the ProComm software:

1. Remove the shrink-wrap from the ProComm package and remove the ProComm Distribution Diskette.
2. Make a backup copy of both the ProComm diskette and the 3Com provided diskette (the FDK diskette).
3. Place the 3Com diskette in the floppy drive and change to that drive by typing **a:** or **b:**.
4. Type the command **FDK** and press [ENTER] to display the initial installation screen as shown in Figure 5-1.

```
A:> FDK      [ENTER]
```

```
*****
*                               Chipcom CORPORATION                               *
* Firmware Distribution Kit      Copyright 199X Chipcom Corporation             *
*                               *                                                *
* This Firmware Distribution Kit will install and configure ProComm,           *
* a terminal emulation program, on you computer's hard disk or on a          *
* second floppy drive. The program will reside in the directory               *
* called PROCOMM. Make sure you have the PROCOMM Distribution                 *
* Diskette and the 3Com Firmware Distribution Diskette ready at all           *
* times during the installation.                                              *
*****

Enter the Source Drive :
Enter the Destination Drive :
Enter the COM Port (1-4) :
Start the Installation

Press ENTER to accept the current drive selections and start
the ProComm Installation.

↓, TAB: Next Field  ↑: Previous Filed  Enter: Accept  ESC: Quit →
```

Figure 5-1. Initial Installation Screen

- 5. Enter the letter of the source drive where you will be inserting the ProComm diskette following the "Enter the Source Drive:" prompt. For a hard drive installation, this is the drive where the current 3Com FDK diskette is installed. For a floppy disk installation, this is the second disk drive. Then press the Down Arrow key (↓) or [TAB] to move the cursor to the next field.
- 6. Enter the letter of the destination drive where you want ProComm to be installed following the "Enter the Destination Drive:" prompt. For a hard drive installation, this is usually **c** or **d**. For a floppy disk installation, this is the drive where the FDK disk is installed, either **a** or **b**. Then press the Down Arrow key (↓) or [TAB] to move to the next field.

7. Enter the number of the communications port (COM1, COM2, etc.) to which you will be connecting the RS-232 cable on the PC to perform the software download following the " Enter the COM Port (1-4):" prompt. Then press the Down Arrow key (↓) or [TAB] to move to the next field.

Note: If the message " ProComm directory already exists, overwrite files?" displays, you have the choice of overwriting the files or quitting the installation. If you enter Y to overwrite the files, the existing ProComm files are deleted and then the new files are copied to the selected drive.

If you are performing a *two-floppy installation*, follow step 8. If you are performing a *floppy-to-hard drive installation*, follow steps 9 and 10.

8. Press [ENTER] if the source and destination drive identifiers and the COM port selection are correct. Then, insert the ProComm diskette in the appropriate drive and press [ENTER] to install and configure ProComm directly on the FDK diskette. The floppy installation is complete when the message " INSTALLATION COMPLETE" displays. Label the FDK diskette as now having ProComm installed so you can locate this diskette when necessary.
9. Press [ENTER] if the source and destination drive identifiers and the COM port selection are correct and the installation process begins. Insert the ProComm diskette into the diskette drive when prompted as shown in Figure 5-2.

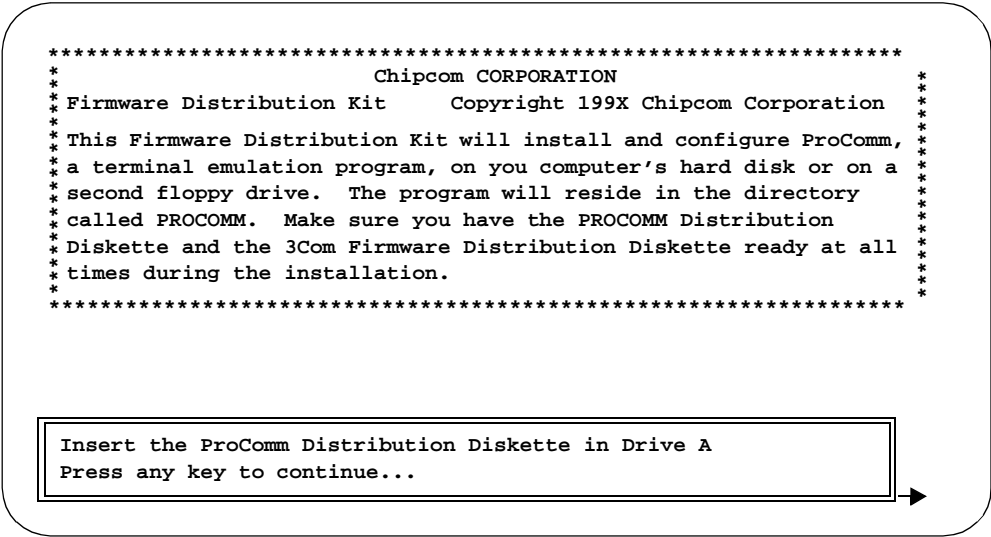


Figure 5-2. ProComm Installation Screen

- 10. Once ProComm is installed on the hard drive, you will be prompted to swap in the 3Com FDK diskette as shown in Figure 5-3. Make sure you place the correct diskette in the disk drive before pressing [ENTER].

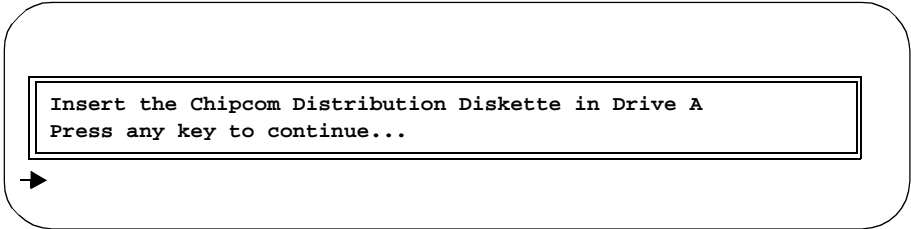


Figure 5-3. Post-ProComm Installation Screen

This last step of the installation loads the ProComm configuration file. The configuration file sets the parameters that are used by ProComm to communicate with the EMM. The parameters are as follows:

Baud= 9600

Data Bits= 8

Stop Bits= 1

Parity= None

COM Port= (Port number selected in step 7)

11. The message " Installation Complete" is displayed. ProComm is now installed and ready for use.

Connect the RS-232 Cable

This step provides instructions for connecting your PC to the Ethernet Management Module so you can download the software to the Flash EPROM. Follow the instructions below:

1. Connect the provided RS-232 cable to the Ethernet Ring Management Module RS-232 serial port connector on the front panel of the module.
2. Connect the other end of the cable to the serial port on your PC (using the provided 9- to 25-pin adapter if necessary). Make sure you connect the cable to the communications port you specified for ProComm during the FDK installation procedure.

Preparing to Download the New Software

This procedure copies the new EMM software to the Flash EPROM on the Ethernet Management Module. Note that this procedure creates a file called **profile.cmd** in the PROCOMM directory. If you currently have a file with that name, rename it before the UDK download so that it does not get overwritten. If PROCOMM is on the FDK disk, the disk *must be* write enabled.



Warning: Do not interrupt power to the concentrator during the download process or you may corrupt the Flash EPROM.

1. Make a backup copy of the 3Com UDK diskette.
2. Place the 3Com UDK diskette in the floppy drive and change to that drive by typing **a:** or **b:**.
3. Type the command **UDK** and press [ENTER] to display the initial installation screen as shown in Figure 5-4.

A:> UDK [ENTER]

```
*****
*
*                               Chipcom CORPORATION
* Update Distribution Kit      Copyright 199X Chipcom Corporation
* This Update Distribution Kit will start ProCommso you can
* download new software to your 3Com device. Make sure you follow
* the instructions carefully to avoid downloading the wrong file
* to your device. Downloading the wrong file may damage the
* device.
*
*****

Enter the Source Drive :
Enter the ProComm Drive :
Start Procomm

Press ENTER to accept the current drive selections and start
ProComm.

↓ TAB: Next Field ↑ : Previous Filed Enter: Accept ESC: Quit →
```

Figure 5-4. Initial UDK Installation Screen

4. Enter the letter of the source drive (where you inserted the 3Com UDK diskette) following the "Enter the Source Drive:" prompt. Then press the Down Arrow key (↓) or [TAB] to move the cursor to the next field.

5. Enter the letter of the drive where ProComm has been installed following the "Enter the Destination where ProComm resides:" prompt. For a hard drive installation, this is usually **c** or **d**. For a floppy disk installation, this is the drive where the FDK disk is installed, usually **a** or **b**. Then press the Down Arrow key (↓) or [TAB] to move to the next field.
6. If the source and destination drive identifiers are correct, press [ENTER] to begin the installation process. The ProComm Header screen displays quickly and then the ProComm Status Line screen appears as shown in Figure 5-5.

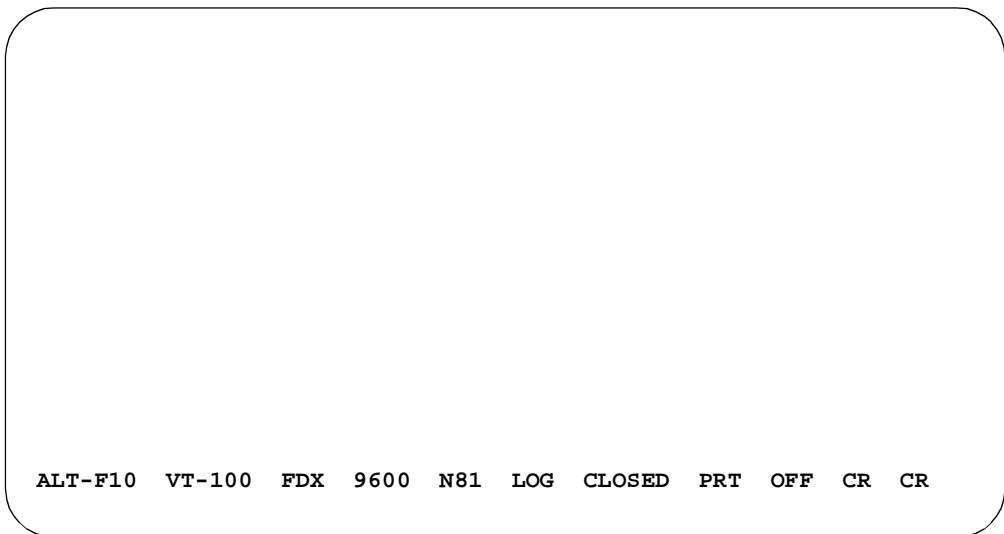


Figure 5-5. ProComm Status Line Screen

Follow the next procedure to complete a software download to the EMM.

Downloading the New Software

Use the following procedure to download software to the EMM.

1. Press [ENTER] to display the ONline> prompt and then log in to the EMM as the system administrator.
2. Type the **MAINTAIN** command to enter maintenance mode where the download can be completed.

```
ONline> maintain      [ENTER]
Enter administrator password:
```

Enter the administrator password for that EMM and the following is displayed:

```
Network agent executive system controller (vx.x)
Copyright 199x Chipcom Corporation
>>
```

3. Type the following download command and press [ENTER] to begin the download procedure.

```
>> download out_of_band [ENTER]
```

WARNING:

Download will erase your current operational code.
You will need the following to replace the software:

1. PC running ProComm communications software.
2. Chipcom Network Management Module software media.
3. The serial number of the Upgrade Distribution Kit.
4. Chipcom Key Code, which is provided by completing the UDK fax form and faxing it to 3Com at (508)460-6195.
Please list your return fax number, your Upgrade Distribution Kit Serial number, plus for non-site licenses
Management Module's ID number: 3658117

If you are positive you want to perform a download, enter the 'download out_of_band' command again within 10 seconds. Otherwise the sequence will be aborted.

```
>>
```

4. Press the key sequence [CTRL-R] to redisplay the previous command and then press [ENTER] to initiate the download. (If the download sequence times out before you press [CTRL] [R], retype the download command.)

```
>> download out_of_band [ENTER]
```

```
Enter Upgrade Distribution Kit Serial number:
```

5. Enter the serial number from the UDK diskette and press [ENTER].

```
Enter Chipcom Key Code:
```

6. Enter the key code supplied by 3Com Corporation. Then press [ENTER] to initiate the download process.
7. Once the message "Please enter download sequence: <ALT> <F5> <CR>" displays, press the key combination [ALT-F5] and the ProComm Menu Screen displays as shown in Figure 5-6.

Note that you must enter this key sequence within 10 seconds or the download will abort. If the command is timed out, return to Step 3 and retype the Download command.

```
EMM1> maintain
Enter administrator password:
ONlin
versi
>> do
Command file:
Command Files
EMMx_xx.CMD

WARNING:
Download will erase your current operational code and
new software. You will need the following to replace
software:

1. PC running ProComm communications software.
2. Chipcom Netowrk Management Module software media (UDK).

If you are sure you want to perform a download command again within
10 seconds or the download will be aborted.

Preparing device for download...
Please enter the download sequence: <ALT> <F5>
▶
ALT-F10 VT-100 FDX 9600 N81 LOGCLOSED PRT OFF CR CR
```

Figure 5-6. ProComm Menu Screen

8. Press [ENTER] to download the selected file to the EEPROM. This process takes approximately 12 to 20 minutes at 9600 baud. If you use a slower baud rate, the download will take much longer.
Once the download process begins, do not press any keys or otherwise interfere with the process.
As the download proceeds, the screen shown in Figure 5-7 is displayed and the Download LED on the EMM lights.

```
Download successful.  
>> boot  
<Boot messages display for new operational code>  
Ethernet Management Module (v x.xx) Copyright 199x Chipcom  
Corporation...  
➔
```

PROTOCOL:	XMODEM
FILE NAME:	emmx_xx.bin
FILE SIZE:	xxxxxx
BLOCK CHECK:	CRC
TRANSFER TIME:	xx:xx
BYTES TRANSFERRED:	xxxx
BLOCKS TRANSFERRED	xxxx
BLOCKS IN FILE:	xxxx
ERROR COUNT:	0
LAST MESSAGE:	NONE

Figure 5-7. ProComm Download Screen

The PC will beep to indicate that the download has completed and also display 'Download successful'. If error messages are displayed on the screen, refer to the Troubleshooting section in this chapter.

9. Press the key sequence [ALT-X] and the "EXIT TO DOS? (Y/N)" prompt displays as shown in Figure 5-8.

```
EXIT TO DOS? (Y/N)  
➔
```

Figure 5-8. Exit ProComm Screen

10. Enter "Y" to exit from ProComm and the UDK Completion Screen displays as shown in Figure 5-9.

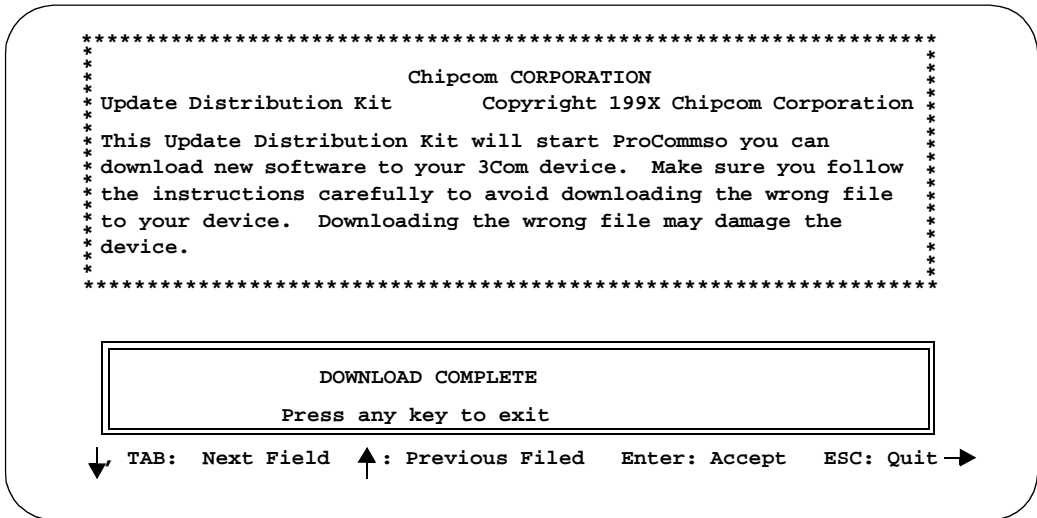


Figure 5-9. UDK Completion Screen

11. Press any key to exit from the UDK program.
12. Disconnect the cable from the PC and the Ethernet Management Module. The EMM is now updated with the new software.

Inband Download Instructions

The EMM provides an inband download feature that allows you to update your EMM Flash EPROMs using TFTP (Trivial File Transfer Protocol). TFTP allows the transfer of files to and from a remote machine. By using the TFTP protocol, you can inband download new EMM software to an EMM from a remote network server.

Note: You can perform an inband download (remotely or locally) when you are logged into an Advanced EMM. However, you cannot perform an inband download when you are remotely logged into either a Starter or Basic EMM. This is because Starter and Basic EMMs must be in maintenance mode in order to perform an inband download. When an EMM enters maintenance mode, a remote session is disconnected.

The following prerequisites must be completed prior to initializing the download:

- ❑ You must have a TFTP server on the network to perform inband downloads
- ❑ EMMs to be updated must be assigned to the same network as the TFTP server

Use the following procedure to perform an inband download to a Starter, Basic, or Advanced EMM. Additional steps required to perform a download from maintenance mode are included.

1. Transfer the contents of the UDK floppy disk to your network TFTP server using the copy command for DOS-based systems. Use the *FTP BINARY* mode for UNIX-based systems. Note that the FTP BINARY mode must be specified instead of the default ASCII mode or the file will be corrupted.

Note: If your TFTP server is running on a UNIX machine, you need to FTP the file from the DOS machine to the server. If your server is running in a DOS environment, you must be in the directory that contains the.BIN file when you start the server.

The floppy disk contains one file - **emm400.bin**, which updates the Flash EPROM.

2. Connect the provided RS-232 cable to the Ethernet Management Module RS-232 serial port connector on the front panel of the module. Then connect the other end of the cable to the serial port on your PC (using a 9- to 25-pin adapter, if necessary).

You may also use Telnet or Remote_Login to perform inband downloads to an Advanced EMM. By establishing a remote session from an Advanced EMM to another EMM, you may issue TFTP commands and perform the download remotely.

3. Configure the TFTP parameters by issuing the following three management commands as shown below. Note that these parameters must be set for *each* EMM to be updated. To update multiple EMMs, you must log in to or establish a Telnet session with the next EMM to be updated and issue the TFTP commands for that EMM.

```
ONline> set tftp file_name [ENTER]
ONline> set tftp server_ip_address [ENTER]
```

4. If you are performing the download from Maintenance mode, you must also issue the SET DOWNLOAD NETWORK command to configure the EMM to the network to which the server is connected.
5. Issue the SHOW TFTP command as shown to verify the TFTP parameters previously set.

```
ONline> show tftp [ENTER]
TFTP Server IP Address:   nnn.nnn.nnn.nnn
TFTP File Name:          emmv400.bin
TFTP Result:             CLEAR
```

6. Issue the DOWNLOAD INBAND command as shown to begin the download.

```
ONline> download inband
```

```
WARNING: Download will erase your current operational code.  
You will need the following to replace the software:
```

1. Chipcom Management Module Software residing on a TFTP server accessible over the network.
2. The TFTP variables (see SHOW TFTP and SET TFTP) must be set up to point to the TFTP server. The DEVICE variables (see SHOW DEVICE and SET DEVICE) must be set up to a valid IP configuration.
3. The serial number of the Upgrade Distribution Kit.
4. Chipcom Key Code, which is provided by completing the UDK fax form and faxing it to 3Com at (508) 460-6195. Please list your return fax number, your Upgrade Distribution Kit Serial Number, plus for non-site licenses: Management Module's ID number:
3658117

```
If you are positive that you want to perform a network  
download, enter the download inband again within 10  
seconds. Otherwise, the sequence will be aborted.
```

7. Press the key sequence [CTRL-R] to redisplay the previous command and press [ENTER] to begin the download process.

```
ONline> download inband [ENTER]
```

```
Enter Upgrade Distribution Kit Serial number:
```

8. Enter the serial number from the UDK diskette and press [ENTER].

```
Enter 3Com Key Code:
```

9. Enter the Key Code number as supplied from 3Com Corporation and press [ENTER].

```
Enter Administrator Password [ENTER]
```

10. Enter the administrator password and press [ENTER]. Once the download begins, do not press any keys or interfere with the process.

If you are logged into an EMM **remotely**, the following message is displayed. Once this message displays, the remote session is terminated and the download begins.

Note: Performing an inband download will end your remote login session. It will be necessary for you to `remote_login` again to check your TFTP result code.

Wait three to five minutes allowing the download to complete before re-connecting to the EMM. You may then log in remotely to the EMM. Issue the `SHOW TFTP` command to display the TFTP Result Field and verify that the download transfer was successful.

If you are logged into an EMM **locally**, the download begins once you enter the administrator password.

When the download completes, the following message is displayed when the EMM boot up under the new software.

```
Inband Download Successful
Rebooting System: standby
Ethernet Management Module (vx.xx) Copyright (c) 199x
Chipcom Corporation
```

Press [ENTER] to display the Password: prompt. Enter the administrator password to log into the EMM.

If error messages are displayed, refer to the Troubleshooting section beginning on the next page.

Troubleshooting

This section discusses possible problems you may encounter during the out-of-band or inband download procedures. The problems are divided into ProComm Problems and Ethernet Management Module Problems.

ProComm Problems

If the problem is not listed in Table 5-1, *UDK Error Messages*, refer to the *ProComm Reference Manual*. Refer also to Table 5-2 which lists EMM download error messages.

Table 5-1. UDK Error Messages

Message	Troubleshooting Suggestion
Invalid Source or ProComm Drive Specifications	The drive letter entered where the UDK program may find the 3Com distribution diskette, or ProComm is invalid. The drive letter entered for the 3Com distribution diskette must be 'A' or 'B'. The drive letter entered where the UDK may find ProComm cannot be the same as the drive letter entered to find the 3Com distribution diskette.
Specified Source Drive is inaccessible, Drive latch closed?	The specified drive letter for the UDK program to find the download files is inaccessible. Verify the floppy drive exists, the diskette is inserted, and the drive latch is closed.
Specified ProComm Drive is inaccessible	The specified drive letter for the ProComm drive is inaccessible. Verify the specified drive exists and ProComm is installed on it.
You must have ProComm to successfully download Installation Terminated, press any key to exit	The UDK program is unable to locate a ProComm subdirectory on the specified destination drive. Verify that a directory called \PROCOMM exists on the destination drive and that the ProComm files are in it.

Table 5-1. UDK Error Messages (Continued)

Message	Troubleshooting Suggestion
Fatal Error: Insufficient Available Memory to run ProComm	A minimum of 200k bytes of free memory is necessary to successfully run ProComm and to do the download. Decreasing the number of Terminate and Stay Resident Programs present while running the UDK program will free memory.
Fatal Error: Unable to run ProComm or ProComm not found	The ProComm subdirectory on the destination drive does not contain ProComm or ProComm has been corrupted. Verify that ProComm exists on the destination drive subdirectory \PROCOMM. You may also want to run the DOS CHKDSK utility on the drive to ensure that the files are not corrupt.

Ethernet Management Module Problems

EMM problems during the download cause an error statement to be displayed on the screen. Common error messages and their meanings are discussed in Table 5-2. If it is necessary to contact 3Com Support, follow the procedure outlined in Appendix D.

Table 5-2. EMM Download Error Messages

Message	Troubleshooting Suggestion
Maximum bad CRC—transfer aborted	Check the RS-232 cable and retry. If the problem persists, call 3Com Support.
Transfer timeout—transfer aborted	Try again. If the problem persists, call 3Com Support.
Packet out of sequence—transfer aborted	Try again. If the problem persists, call 3Com Support.
Incorrect code type—transfer aborted wrong version of software	Try again. If the problem persists, call 3Com Support.
Incorrect code version—transfer aborted, wrong version of software	Try again. If the problem persists, call 3Com Support.
RAM write error—transfer aborted	Try again. If the problem persists, call 3Com Support.
RAM verify error—transfer aborted	Try again. If the problem persists, call 3Com Support.
RAM CRC error—transfer aborted	Try again. If the problem persists, call 3Com Support.
FEPRoM program error—transfer aborted	Call 3Com Support.
FEPRoM overflow—transfer aborted	Call 3Com Support.
FEPRoM erase error—transfer aborted	Call 3Com Support.
FEPRoM initialization error — transfer aborted	Call 3Com Support.

Table 5-2. EMM Download Error Messages (Continued)

Message	Troubleshooting Suggestion
FEPROM CRC download error— transfer aborted	Call 3Com Support.
FEPROM CRC write error — transfer aborted	Call 3Com Support.

A *Specifications*

This appendix lists specifications for the ONline Ethernet Management Module (EMM). There are five sections:

- ❑ General Specifications
- ❑ Electrical Specifications
- ❑ Environmental Specifications
- ❑ Mechanical Specifications
- ❑ Hardware Specifications

General Specifications

Model Numbers: 5101M-MGTS, 5101M-MGTB, 5101M-MGTA

Data Rate: 10 Mbps (million bits per second)

Data modulation: Manchester

Diagnostic modulation: Link Integrity pulse

Backplane Interface: 96-pin edge connector, compatible with the 3Com ONline System Concentrator.

Port Connector: RS-232 (DB-25)

Electrical Specifications

Power Requirements: +5V \pm 5%, +12V \pm 5%, -12V \pm 5%
3.0 Amp for +5V, 0.06 Amp for +12V, 0.03 Amp for -12V

Fuse: 4.0 Amp Fast Blow for +5V

2.0 Amp Fast Blow for +12V

2.0 Amp Fast Blow for -12V

Watts: 16 Watts

Environmental Specifications

Operating Temperature: 0° to 50° C (32° to 122° F)

Storage Temperature: -30° to 65° C (-22° to 149° F)

Humidity: less than 95%, non-condensing

BTU/hour: 51.2

Mechanical Specifications

Dimensions: 1.0" W x 10.25" L x 8.5" H

(2.54 cm x 26.04 cm 21.6 cm)

Weight: 1.25 lb. (.57 kg.)

Hardware Specifications

Memory

256 Kbytes of "0 Wait State" SRAM (expandable to 1/2 megabyte)

256 Kbytes of "Flash" EPROM (Field Reprogrammable PROM)

64 Kbytes of Boot EPROM

8 Kbytes of EEPROM (Electronically Erasable PROM)

2 Kbytes of Dual Port SRAM

Special Circuits

Per-Port Monitoring Circuit

Per-Port Collision Counting Circuit

Real-Time Clock

B *RS-232 Cable Specs and Modem Use*

This appendix describes the cable pinouts for the RS-232 cable used to connect the Ethernet Management Module (EMM) to a device. It also explains the requirements for connecting a modem to the EMM.

RS-232 Cable Specifications

The RS-232 cable connects to the management interface on the EMM front panel. The management interface is designed to connect to a cable offering a male DTE interface. Table B-1 defines the RS-232 cabling guidelines that apply for connecting devices to the management interface.

Table B-1. RS-232 Cable Guidelines

Device	Cable
Terminal	Female-to-female crossover (pin 2 to 3 and pin 3 to 2)
	Female-to-male crossover (pin 2 to 3 and pin 3 to 2)
Modem	Male-to-female straight-through (1 to 1, 2 to 2, etc.)
Terminal Server	Refer to Supplier Documentation

When you first connect your terminal to the EMM management interface, make sure it is properly set for asynchronous serial communication. Figure B-1 illustrates the RS-232 connector on the front panel of the EMM and shows the proper pinouts for a crossover RS-232 cable (either female-female or female-male).

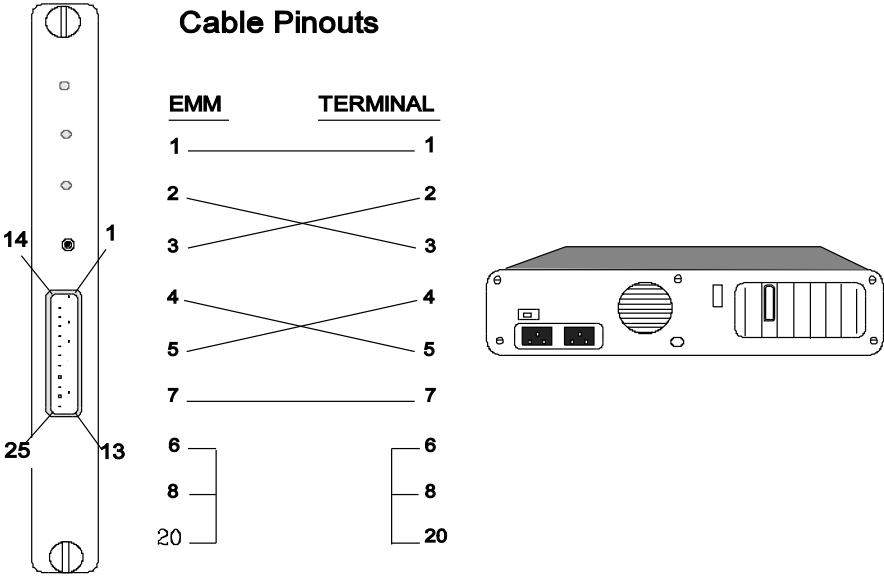


Figure B-1. Management Interface RS-232 Connector and Cable Pinouts

Modem Use

The Ethernet Management Module enables you to use a dial-in modem. The requirements are as follows:

1. The modem must be 100% Hayes compatible.
2. Any baud rate in the range (300, 1200, 2400, 9600) may be used. Higher rates are preferred.
3. The modem must be placed in Dumb/Auto Answer mode. This is accomplished by entering the following commands from a terminal directly connected to the modem:

at& [ENTER] . . Restore factory defaults

at&d0 [ENTER] . Ignore changes in DTR status

ats0=1 [ENTER] . Auto-answer on first ring

ats0? [ENTER] . . Verify auto-answer (should return 001)

atq1 [ENTER] . . Does not return result codes

at&W [ENTER] . . Save this configuration

at&Y [ENTER] . . Define this configuration as default

Note: * If you issue the SET TERMINAL HANGUP ENABLE command for modem use, you must change the DTR parameter as defined below to ensure proper modem operation.

*) **at&d2 [ENTER]** . Indicates hangup and assumes command
. state when an On to Off transition of
. DTR occurs

If necessary, follow the commands in your modem user manual to place the modem into dumb mode (command recognition disabled).

C *MIB Groups*

This appendix describes the MIB-II and 3Com MIB groups that are supported in EMM version 4.0.

MIB-II Groups

The following MIB-II groups are supported in EMM v4.0.

- system
- if
- at
- ip
- icmp
- udp
- snmp

3Com MIB Groups

The following 3Com MIB groups are supported in EMM v4.0.

- ❑ - chipAlert
- ❑ - chipDownload
- ❑ - chipGen
- ❑ - chipTFTP
- ❑ - chipTTY
- ❑ - olEcho
- ❑ - olAgents
- ❑ - olConc
- ❑ - olEnv
- ❑ - olModules
- ❑ - olNet
- ❑ - olEnet
- ❑ - olTrnetMapState {olTRnet 1}

D

Technical Support

3Com provides easy access to technical support information through a variety of services. This appendix describes the following services:

- On-line Technical Support
- Support from Your Network Supplier
- Support from 3Com
- Returning Products for Repair
- Accessing the 3Com MIB
- 3Com Technical Publications

On-line Technical Support

3Com offers worldwide product support through the following on-line systems:

- Email Technical Service
- World Wide Web Site

Email Technical Support

You can contact the Integrated Systems Division (formerly Chipcom) on the Internet for technical support using the e-mail address techsupp@chipcom.com.

World Wide Web Site

You can access the latest networking information on the 3Com World Wide Web site by entering our URL into your Internet browser:

<http://www.3Com.com/>

This service features news and information about 3Com products, customer service and support, the 3Com latest news releases, selected articles from 3TECH™, the 3Com award-winning technical journal, and more.

You can contact the Integrated Systems Division on the World Wide Web by entering our URL into your Internet browser:

<http://www.chipcom.com/>

There are links between both WWW pages to view information from all 3Com divisions.

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- ❑ Diagnostic error messages
- ❑ A list of system hardware and software, including revision levels
- ❑ Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

For direct access to customer service for Integrated Systems Division products in:

- ❑ U.S.A. and Canada - call (800) 724-2447
- ❑ Asia Pacific - call (508) 787-5151
- ❑ Europe - Refer to the table below. For European countries not listed, call 31 30 60 299 00.

Country	Telephone Number	Country	Telephone Number
Belgium	0800 71429	Netherlands	06 0227788
Denmark	800 17309	Norway	800 11376
Finland	0800 113153	Spain	900 983125
France	05 917959	Sweden	020 795482
Germany	0130 821502	U.K.	0800 966197
Ireland	1 800 553117	U.S.	800 876-3266
Italy	1678 79489		

For access to customer service for all 3Com products, call (800) 876-3266.

You can also contact the Integrated Systems Division (ISD) on the Internet by using the e-mail address techsupp@chipcom.com.

Returning Products for Repair

A product sent directly to 3Com for repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to 3Com without an RMA number will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number for Integrated Systems Division products (formerly Chipcom), use the following numbers.

Country	Telephone Number	Fax Number
U.S. and Canada	(800) 724-2447	(508) 787-3400
Europe	(44) (1442) 275860	No Fax
Asia Pacific	(508) 787-5296	(508) 787-3400

Accessing the 3Com MIB

The 3Com Management Information Base (MIB) for the Integrated Systems Division describes commands that enable you to manage 3Com SNMP-based products. The MIB is available over the Internet on an anonymous FTP server. Updates to these MIBs are released as new 3Com products are introduced.

To access Internet versions:

1. FTP to [ftp.chipcom.com](ftp://ftp.chipcom.com) (151.104.9.65).
2. Enter the login name `anonymous`.

3. Enter your full Internet e-mail address as the password (for example, `jd@company.com`).
4. Change to the `mib` or `schema` directory using the `cd /pub/mibs` or `cd /pub/mibs/schemas` command.
5. To view the 3Com MIB, OID, or schema entries, enter the `dir` command.
 - ❑ To pause the display, press [CTRL-S].
 - ❑ To continue the display, press [CTRL-Q].
6. Copy the MIB, OID, or schema files to your current directory using the appropriate command (for example, `get chipcom.mib`).
7. To exit the FTP session, invoke the `quit` command.

3Com Technical Publications

If you have comments or questions on 3Com Integrated Systems Division Technical Publications documents, please contact the Technical Publications group by FAX (508) 229-1551.

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